ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 9.] [1909.

L.—GARDEN NOTES ON NEW TREES AND SHRUBS.

W. J. Bean.

I. New Chinese Species.

The wonderful beauty and variety of the arborescent flora of Western and Central China, long ago suggested to us by the dried material of Mr. A. Henry and other travellers, is now being strikingly revealed by the living plants themselves. The present decade has witnessed the introduction to cultivation of a more remarkable assemblage of new hardy trees and shrubs than any previous one, even if we include the busiest years of such collectors as Douglas, Fortune, and William Lobb. Primarily, we owe this to the business enterprise of Messrs. J. Veitch & Sons, and to the liberality of Harvard University. Two expeditions on behalf of the former and one on behalf of the latter have been made by Mr. E. H. Wilson, an élève of Kew. The combination of qualities that have made him one of the greatest of plant collectors must be recognised as having had much to do with their success.

One of the most remarkable things about these Chinese introductions is the number of new and monotypic genera that there are amongst them. Apart from whatever beauty of flower or leaf they may possess, there is always a peculiar charm and interest attached to these solitary types. Most of the following are of this character, and it is thought that a few notes placing on record their first introduction to cultivation and a brief description of their leading features may be of some value to the growing number of cultivators of hardy trees and shrubs in the British Isles.

Carrieria calycina, *Franchet* [Bixaceae]; Revue Horticole, 1896, p. 498 with fig.

A deciduous tree 20 to 30 feet (sometimes 40 feet) high, with a wide-spreading head of branches. Leaves ovate, up to 5 inches in length with a short acuminate tip, coarsely crenate. Flowers in terminal panicles 6 inches long, cup-shaped, 1 inch across, very pubescent, bluish-white. Fruit a capsule 3 to 4 inches long, covered with pubescence.

(14572—6a.) Wt. 108-471. 1375. 11/09. D & S.

Mr. Wilson describes this tree as one of great beauty in flower. It was introduced by him for Harvard University, and from seeds presented to Kew by that institution this year, small plants have been raised.

It is a native of Central and Western China at altitudes of 2000 to 3000 feet. Of its hardiness nothing certain can be stated, but other trees and shrubs from similar elevations have proved capable of withstanding our winters. Monotypic.

Dipteronia sinensis, *Oliver* [Sapindaceae]; Hooker's Icones Plantarum, t. 1898.

Although closely allied to the Maples this species is remarkably distinct, especially in foliage and fruit.

It is a bush or small tree up to 25 feet in height, with deciduous pinnate leaves, about 1 foot in length on adult trees. The leaflets are usually nine to thirteen in number, opposite, 3 to 4 inches long, ovate to lanceolate, sharply and coarsely serrate. The small white flowers are borne in erect pyramidal panicles 9 to 12 inches long. The fruits are winged like those of a Wych Elm or a *Ptelea*, being flat, obovate, and $\frac{3}{4}$ to 1 inch long.

This tree is growing well in Messrs. Veitch's nursery at Coombe Wood and has recently been presented by them to Kew. It is undoubtedly hardy and, having a marked beauty of flower and leaf as well as very interesting fruits, it should prove a most desirable acquisition to gardens.

A native of Central China up to 5000 feet. Monotypic.

Kolkwitzia amabilis, *Graebner* [Caprifoliaceae].

This is a deciduous shrub 5 to 6 feet high, with opposite, ovate leaves, 2 to 3 inches long, shallowly serrate and very pubescent. The flowers do not appear to have been seen by botanists, but the fruits are quite remarkable. They are produced in short terminal clusters, each fruit about $\frac{1}{4}$ inch across, covered, like the pedicels, with numerous long, yellowish-brown bristles; and standing out beyond each fruit is the persistent elongated calyx, with its five narrow, radiating lobes.

This singular shrub has for several years been growing in the Combe Woode nursery, having been introduced for Messrs. Veitch by Mr. Wilson. Through their kindness it has been added to the Kew collection.

It grows in Hupeh on the watershed of the Han and Yangtse Rivers, among rocks at 9000 to 10,000 feet altitude. Coming from these elevations it should undoubtedly prove hardy. Monotypic.

Prinsepia sinensis, *Oliv.* MS. [Rosaceae-Pruneae].—*Plagiospermum sinense*, Oliver, in Hooker's Icones Plantarum, t. 1526.

When this shrub was first described by Professor Oliver as *Plagiospermum* in Hooker's Icones Plantarum, t. 1526, it was, in the absence of fruit, doubtfully placed in *Celastraceae*. That was in 1886, and since then not only has fruit become available, but the plant itself is in cultivation. It is now found to belong to *Prinsepia*, a small genus of *Rosaceae*. Kew owes it to the generosity of M. Philippe de Vilmorin, who sent a small plant in the autumn of 1908 which stood uninjured in the Arboretum nursery during last winter, and is now very healthy.

This is a deciduous spiny shrub of lax spreading habit, now about 6 feet high with M. de Vilmorin at Verrières. Leaves alternate, oblong-lanceolate, 1½ to 2 inches long, ½ inch wide, produced in fascicles on the year-old branches along with the flowers. Flowers bright yellow, ½ to ¾ inch across, produced singly on slender peduncles 1 inch long in few-flowered fascicles. Fruit red, resembling a small plum.

A native of Manchuria, and appears to be a very attractive flowering shrub of a type quite new to gardens.

Poliothyrsis sinensis, *Oliver* [Bixaceae]; Hooker's Icones Plantarum, t. 1885.

There is already in gardens a very interesting Bixaceous tree—*Idesia polycarpa*—to which this new *Poliothyrsis* bears a close superficial resemblance.

The latter is a small tree, 30 feet or so high, with variable but more or less ovate leaves 6 to 9 inches long, 3 to 6 inches wide, pointed and shallowly toothed. The flowers are greenish-white and borne in a large, erect panicle. The fruit is a dry, ellipsoid capsule, ¾ inch long, and thus very distinct from the globose, dark red berry of the *Idesia*.

Its fine broad leaves should make it a desirable lawn tree. It is common in Hupeh at 2500 to 3000 feet, and was introduced by Mr. Wilson for Harvard University in 1908. From seed presented to Kew by that institution a number of small plants have been raised, most of which survived last winter planted out in the Arboretum nursery.

Sinofranchetia sinensis, *Hemsl.* [Berberidaceae]; Hooker's Icones Plantarum, t. 2842.

The *Lardizabaleae* section of this Natural Order is already represented in gardens by the asiatic genera *Holboellia* and *Stauntonia*, to which this new plant is allied. Neither of them is really hardy away from a wall or similar protection, whereas five plants of the *Sinofranchetia* in the nursery at Kew passed through the winter of 1908–9 absolutely unaffected by cold, although they were only young seedlings planted out the previous spring.

This is a large deciduous climber which covers trees 40 feet high. Its main stem is often 3 to 4 inches thick, and, after the fashion of its allies, the branches uphold themselves by twining round whatever support is available. The leaves are ternate, glaucous; the petiole 6 to 9 inches long. The flowers are dull white, small and inconspicuous, and of no beauty. The fruits, however, are striking; they are borne in threes at intervals on an elongated rachis 8 inches or more long, each fruit blue-purple and about the size of an average grape.

A native of Central and Western China, up to 7000 feet, introduced for Harvard University. Monotypic.

Sinowilsonia Henryi, *Hemsl.* [Hamamelidaceae]; Hooker's Icones Plantarum, t. 2817.

A deciduous shrub or small tree occasionally over 20 feet in height. The leaves are broadly elliptic to obovate, rather like those of a lime, 3 to 6 inches long, strongly veined beneath and

covered there with a copious, stellate pubescence; margins bristly-toothed. The greenish flowers are in slender pendulous racemes 9 inches long.

Introduced by Mr. Wilson for Harvard University from Hupeh, China, where it inhabits the banks of mountain streams at altitudes of 3000 to 4000 feet. Of its hardiness nothing definite can be said at present, but judging by its habitat it ought to be as hardy as the *Sycopsis*, to which it is very closely allied, The genus is at present monotypic, but some young plants growing in the Coombe Wood nursery under a different number from that of *S. Henryi* may perhaps prove to be another species of this genus.

Sycopsis sinensis, *Oliver* [Hamamelidaceae]; Hooker's Icones Plantarum, t. 1931 and t. 2834 (♂ flowers).

Although several species of *Sycopsis* are known, this is the only one hitherto found which is capable of withstanding our winters. There is no doubt it is perfectly hardy. Without any protection, young plants stood the winter of 1908–9 quite unaffected.

It is an evergreen shrub up to 20 feet high, its habit, according to Mr. Wilson, comparable to that of our native hazel (*Corylus Avellana*). The leaves are ovate-lanceolate, 2 to 4½ inches long, rather coriaceous, slightly toothed or entire, glabrous. The plant has little beauty of blossom, having short dense racemes of flowers, the most conspicuous feature of which are the red stamens. Still, it adds a new type to a group of hardy shrubs of exceptional interest and distinction.

Native of the mountains of Central China at 4000 feet.

Tapiscia sinensis, *Oliver* [Sapindaceae]; Hooker's Icones Plantarum, t. 1928.

A small deciduous tree usually about 30 feet high, although one specimen found by Mr. Wilson was 90 feet high with a trunk 12 feet in girth. The leaves are pinnate, 12 to 18 inches long, the leaflets ovate-cordate, serrate, acuminate, 3 to 5 inches long, half as much wide, greyish beneath. Flowers in axillary panicles 4 to 6 inches in length, yellow, quite small ($\frac{1}{12}$ inch long) with a pleasant honey-like fragrance. Fruit ovoid, ½ inch long, black.

Young plants of this species raised from seed presented by Harvard University survived last winter in the Arboretum nursery. Should it prove to be hardy its fine pinnate leaves (changing to yellow in autumn) and its fragrant flowers should make it a welcome addition to our collection of small trees.

A native of Western Szechuan and Western Hupeh at altitudes of about 4000 feet, fairly common in the former province, but rare in Hupeh. Monotypic.

Tetracentron sinense, *Oliver* [Trochodendraceae]; Hooker's Icones Plantarum, t. 1892.

According to Mr. Wilson this is amongst the very largest of the broad-leaved trees of the Chinese forests (that is, excluding Conifers). It is often 80 feet and upwards high, with a trunk 20 feet in circumference. It belongs to that curious family, allied to *Magnoliaceae*, which has been formed to include such diverse genera as *Trochodendron*, *Eucommia*, *Cercidiphyllum* and *Euptelea*,

TAPISCIA SINENSIS.

[*To face page* 356.

TETRACENTRON SINENSE.

[*To face page* 357

all, with the exception of the last, monotypic. The *Tetracentron* bears a considerable resemblance to *Cercidiphyllum japonicum*, but is roughly distinguished by its invariably alternate leaves.

It was introduced by Mr. Wilson for Messrs. Veitch about 1901, and presented by them to Kew. It is certainly quite hardy.

The leaves are deciduous, broadly-ovate with a subcordate base, 4 to 5 inches long, serrate, with five or seven prominent longitudinal nerves. Flowers small, yellowish, in slender spikes about 4 inches long.

A native of Central and Western China from 5000 to 9000 feet. Monotypic.

By the kind permission of Professor Sargent, Arnold Arboretum, Harvard University, photographs of the two last-mentioned plants taken by Mr. Wilson in China are reproduced on the accompanying plates.

Explanation of Plates.

1. **Tapiscia sinensis**, 90 feet × 12 feet, Western Szechuan ; altitude 4,100 feet. The largest specimen found.
2. **Tetracentron sinense**, 70 feet × 8 feet. Chino - Tibetan borderland ; altitude 8,000 feet.

LI.—DECADES KEWENSES.

Plantarum Novarum in Herbario Horti Regii Conservatarum.

DECAS LIV.

531. **Xylia Kerrii**, *Craib et Hutchinson* [Leguminosae-Adenanthereae] ; affinis *X. dolabriformi*, Benth., sed foliis subtus velutinis et antheris eglandulosis differt.

Arbor, ramis irregulariter canaliculatis glabrescentibus, ramulis junioribus brunneo-tomentellis. *Folia* petiolata, bipinnata, pinnis unijugis, petiolis 2–3·5 cm. longis apice glandula magna ornatis puberulis ; rhachis 8·5–10 cm. longa, basi incrassata ; foliola 3–5-juga, plerumque opposita, elliptica vel oblongo-elliptica, breviter obtuse acuminata, basi rotundata vel leviter cordata, usque ad 10 cm. longa et 5 cm. lata, chartacea, arcte reticulata, matura supra glabra, subtus velutina, nervis lateralibus utrinque 7–9 arcuatis utrinque conspicuis ; petioluli circiter 2 mm. longi, teretes, tomentosi, inter eos glandula conspicua ; stipulae subulatae ; stipellae plerumque conspicuae, lanceolatae. *Capitula* multiflora, axillaria, solitaria vel fasciculata, pedunculata, pedunculis 3·5–7 cm. longis sulcatis brunneo-pubescentibus. *Bracteae* filiformes ; bracteoleae elongato-spathulatae, superne subteretes, 3·5 mm longae, ferrugineo-pubescentes. *Calycis* tubus 2–3 mm. longus, extus ferrugineo-pilosus ; lobi 0·75–1 mm. longi, deltoideo-rotundati, extus ferrugineo-tomentosi. *Petala* oblanceolata, obtusa, basi valde attenuata, 4 mm. longa, superne 1 mm. lata, extus ferrugineo-pilosa. *Stamina* 10. *Ovarium* oblique ellipsoideum, 2 mm. longum, ferrugineo-tomentosum ; stylus 5–7 mm. longus, truncatus, glaber ; ovula 8.

Legumen compressum, subfalcatum, lignosum, durum, 12 cm. longum 4 cm. latum. *Semina* 6, elliptica, 1·2–1·5 cm. longa, 0·8–1 cm. lata, compressa, nitida.

Malay Peninsula. Siam: Chiengmai, a medium-sized tree growing in deciduous jungle at the foot of Doi Sootep, about 330 m., *Kerr*, 547.

532. **Terminalia mucronata**, *Craib et Hutchinson* [Combretaceae-Combreteae]; affinis *T. corticosae*, Pierre, sed floribus majoribus et staminibus quam calyce multo longioribus differt.

Arbor magna, superne ramosa (ex Kerr), cortice cano, ramulis pallidis lenticellatis glabrescentibus junioribus fulvo-tomentosis. *Folia* subopposita decidua, elliptica, oblongo-elliptica vel ovato-lanceolata, basi plerumque inaequaliter cuneata, acuta vel vix acuminata, vel matura apice obtusa vel retusa, sed omnia mucronata, usque ad 11 cm. longa et 7 cm. lata, junioria coriacea, supra sericeo-pubescentia, subtus fere fulvo-tomentosa, maturiora chartacea, utrinque pubescentia, nervis lateralibus 8–15 supra conspicuis subtus elevatis; petioli 1–2·2 cm. longi, 2–3 mm. diametro, fulvo-tomentosi, apice glandulis duobus lateralibus ornati. *Spicae* terminales, multiflorae, 9–13 cm. longae, post anthesin circiter 1·5 cm. diametro; pedunculus usque ad 1 cm. longus. *Bracteolae* lineari-lanceolatae, 2 mm. longae, fulvo-tomentellae. *Flores* virides (ex Kerr). *Calycis* limbus cupulatus, 5-dentatus, 2–2·5 mm. altus, 3–4 mm. diametro, utrinque pilosus. *Stamina* 10–12; filamenta circiter 5 mm. longa, flava, glabra, antheris 0·75 mm. longis. *Stylus* quam filamenta paullo brevior, glaber, basi dense villosus. *Fructus* suborbicularis, emarginatus, 3–4 cm. diametro, late 2–3-alatus, fulvus, alis 1–1·5 cm. latis rigide papyraceis.

Malay Peninsula. Siam: Chiengmai, in deciduous jungle on Doi Sootep, 540 m., *Kerr*, 593.

533. **Micholitzia**, *N. E. Brown*, gen. nov. [Asclepiadaceae-Marsdenieae]; affinis *Marsdeniae*, R. Br., sed corollae lobis stricte valvatis et coronae lobis tuberculiformibus patentibus differt.

Calyx parvus, 5-partitus. *Corolla* urceolato-tubulosa vel conico-tubulosa, breviter 5-loba, intra villosa, lobis stricte valvatis. *Corona* tuberculorum patentium 5, tubo stamineo basi affixa. *Stamina* corollae basi affixa, filamentis in tubum brevem connatis, antheris adscendentibus membrana suberecta appendiculatis. *Pollinia* in quoque loculo antherarum solitaria, adscendentia, subsemicircularia, margine recto pellucido. *Stylus* apice conicus, antherarum appendices superans. *Fructus* ignotus.

M. obcordata, *N. E. Brown*, species unica.

Frutex nanus vel suffrutex, ramosus, lactescens. *Rami* erecti, teretes, juniores adpresse puberuli, virides, demum glabri et cinerei. *Folia* opposita, firme vel subrigide coriacea, obcordata vel obovata, apice late emarginata vel truncata, basi cuneata, utrinque minute adpresse puberula; petiolus 3–4 mm. longus; lamina 1·8–3·2 cm. longa, 1·4–2·3 cm. lata; stipulae minutissimae. *Cymae* laterales, ad nodos sessiles vel subsessiles, 4–9-florae. *Pedicelli* 2 mm. longi, minute puberuli. *Sepala* 1 mm. longa, ovata, obtusa, minute puberula. *Corolla* urceolato-tubulosa vel conico-tubulosa, basi 5-gibbosa, extra puberula, intra villosa, olivaceo-virens, lobis

rufescentibus ; tubus 6 mm. longus, basi 3 mm. diam., apice 1·75–2 mm. diam. ; lobi patentes, 1·5 mm. longi, 1 mm. lati, deltoideo-ovati, acuti. *Coronae* tuberculi carnosi, apice emarginati, dorso sulcati, lutei.

India. Without precise locality, *Micholitz*.

Described from a living plant cultivated in the Royal Botanic Gardens, Glasnevin, Dublin. It was obtained from Messrs. Sander & Sons, of St. Albans, who state that it was sent home by Micholitz when collecting in India and Burma. "It was probably received together with *Dendrobium regium*."

534. **Strychnos barbata**, *A. W. Hill* [Loganiaceae-Euloganieae] ; species *S. multiflora*, Benth., foliis triplinerviis et magnitudine florum similis, sed antheris minoribus basi barbatis et ovario ovoideo praecipue differt.

Folia elliptica vel obovato - elliptica, acuta vel acuminata, 8–13 cm. longa, 3·5–6 cm. lata, 5-nervia, triplinervia, nervis 3 principalibus plus minusve 1 cm. supra basin ortis, supra vernicosa, subtus nervis primariis distinctis venis transversis reticulatis inconspicuis instructa ; petioli plus minusve 0·5 mm. longi ; rami et petioli glabri. *Inflorescentia* laxe paniculata, axillaris, inferne glabra superne pedunculis et pedicellis minute hirsutis ; pedicelli 1–2 mm. longi ; bracteae triangulari-ovatae, marginibus hirsutis. *Flores* pentameri. *Calyx* 1 mm. longus, segmentibus orbiculari-ovatis obtusis margine hirsutis. *Corollae* tubus 2 mm. longus ; lobi 2·5 cm. longi, lineari-lanceolati, acuti, apicibus incurvis ; corolla intus longe hirsuta, basi glabra. *Stamina* filamentis paullo sub sinubus insertis 2 mm. longis ; antherae 1 mm. longae, basi barbatae. *Ovarium* orbiculari-ovoideum, 1·5 mm. longum, supra hirsutum ; stylus 2·5–3 mm. longus, paullo hirsutus ; stigma breviter clavatum. *Fructus* baccatus, globosus, immaturus.

New Guinea. Soron, Olandite, *Beccari*, 98.

Beccari's plants bearing the herbarium numbers 6656, 6656A from the Aru Islands may also belong to this species, but in the absence of flowers cannot be exactly determined.

535. **Strychnos cuspidata**, *A. W. Hill* [Loganiaceae-Euloganieae] ; *S. Ignatii*, Berg. ex Oliver, in Hook. Ic. Pl. t. 2212, similis foliis cuspidatis et corollae tubo breviore praecipue differt.

Folia elliptica, cuspidata, 12–16 cm. longa, 6–7·5 mm. lata ; cuspide 1·5–2 cm. longe producto, coriacea, supra vernicosa, trinervia, subtus nervis 3 prominentibus venis transversis plus minusve rectangularibus ; petioli plus minusve 1 cm. longi. *Inflorescentiae* pedunculatae multiflorae, axillares ; pedunculi et pedicelli pilosi ; pedicelli ad 1 mm. longi. *Flores* pentameri. *Calyx* 1 mm. longus, segmentis 0·75 mm. longis ovato-acutis, extra plus minusve pilosus. *Corolla* 8 mm. longa, linearia, 5-loba, lobis 2–3 mm. longis ellipticis ; tubus intus ad basin hirsutus. *Stamina* filamentis paullo sub sinubus insertis ; antherae oblongae, 1 mm. longae, 3-glandulosae. *Ovarium* ovoideum, 1 mm. longum ; stylus 6 mm. longus, stigmate capitato. *Fructus* baccatus, glaber, immaturus, 1·5 cm. diametro.

Borneo. Ragiato di Sarawak, Kuteing, *Beccari*, 1188, 1348.

A very distinct and striking species. The leaves are elliptical with a very regular outline and have a long apical cusp or drip tip. On the underside the three main veins form prominent ridges and the secondary connecting veins are arranged almost at right angles to the main nerves.

536. **Strychnos Forbesii**, *A. W. Hill* [Loganiaceae-Euloganieae]; a *S. laurina*, Wall. foliis latioribus ellipticis, inflorescentiis paniculatis, bracteis et floribus brevioribus differt.

Folia elliptica, 12–15 cm. longa, 6–8 cm. lata, 5–7 nervia plus minusve triplinervia, nervis marginalibus plus minusve inconspicuis, supra paullo vernicosa; petioli circiter 0·5 cm. longi, uti rami glabri. *Inflorescentiae* 1–3, axillares, pedunculis glabris vel parce pilosis 1–2·5 cm. longis 3–6 cymas gerentibus. *Cymae* 3-florae, pedunculis pilosis 0·5–1 cm. longis, pedicellis ad 1 mm. longis; bracteae lanceolatae, acutae, 3–5 mm. longae. *Flores* pentameri. *Calyx* plus minusve 1 mm. longus, segmentis late ovatis, 0·75 mm. longis subacutis marginibus pilosis. *Corollae* tubus 1·5–1·75 mm. longus, lobis 2 mm. longis elliptico-ovatis acutis, intus ad faucem annulatim hirsutus. *Stamina* filamentis 0·25 mm. longis; antherae apice glandulosae, 1 mm. longae, basi paullo barbatae. *Ovarium* globosum, 1 mm. diametro, supra parce hirsutum; stylus 1·5–2 mm. longus, infra parce hirsutus. *Fructus* ignotus.

New Guinea. Sogeri region, central position, 9° 28′ 45″ S. lat. 147° 31′ 37″ E. long., *H. O. Forbes*, 230.

537. **Strychnos ovata**, *A. W. Hill* [Loganiaceae-Euloganieae]; species distincta nulli arcte comparanda foliis ovatis trinerviis, floribus corollae lobis tubo duplo longioribus, ovario et stylo hirsuto.

Folia ovata, acuta, 6–8·5 cm. longa, 3·5–5 cm. lata, trinervia, supra vernicosa; petiolio 0·5 mm. longa. *Inflorescentia* paniculata, axillaris, pedunculis et pedicellis pubescentibus, plus minusve 4 cm. longa, 3 cm. lata. *Cymae* 3-florae, floribus lateralibus pedicellis 2–3 mm. longis instructis; bracteae late ovatae, acutae vel subacutae, 1–1·5 mm. longae, marginibus pubescentibus. *Flores* pentameri. *Calyx* 0·5–0·75 mm. longus, segmentis orbiculari-ovatis subacutis marginibus pubescentibus. *Corolla* extra parce pubescens; tubus 1 mm. longus, lobis 2 mm. longis intus basi hirsutis. *Stamina* filamentis 0·75–1 mm. longis; antherae 0·75–1 mm. longae. *Ovarium* ovoideum, supra hirsutum; stylus 1–1·5 mm. longus, infra parce hirsutus. *Fructus* ignotus.

Philippine Islands. Is. Paragua, *Vidal*, 3315.

538. **Matsumuria**, *Hemsl.* [Gesneraceae - Cyrtandreae]; genus novum ex affinitate *Klugiae* et *Rhynchoglossi*, ab ambobus corollae limbo fere regulari et seminibus linearibus utrinque cristatis differt.

Calyx subbilabiatus, fere a basi 5-partitus, lobis lanceolatis acuminatis leviter inaequalibus postico angustiore. *Corolla* anguste tubuloso-campanulata, leviter obliqua, basi leviter inflata, vix bilabiata, lobis 5 fere aequalibus brevibus rotundatis lateralibus exterioribus, anteriore intimo. *Stamina* perfecta 4, inclusa, fere aequilonga, ad corollae basin inserta, filamentis infra medium dilatatis, antheris magnis per paria conniventibus, loculis divergentibus; staminodium breve, filiforme. *Ovarium* 1-loculare, supra discum carnosum, pulviniformem sessile; placentae 2, bilamellatae,

lamellis utrinque multi-ovulatis ; stylus inclusus. *Capsula* lignosa, anguste ovoidea, calyce inclusa, longitudinaliter dehiscens. *Semina* numerosissima, minuta, linearia, utrinque cristata. *Herba* nana, perennis, caulescens, caulibus simplicibus. *Folia* alterna, petiolata, lanceolata. *Flores* mediocres in racemos terminales elongatos dispositi ; bracteae lineares, pedicellos breves aequantes.—*Rehmannia*? Hemsl. in Journ. Linn. Soc. vol. xxvi. p. 194 ; Matsumura and Hayata, Enum. Pl. Form. in Journ. Coll. Sc. Imp. Univ., Tokyo, vol. xxii. (1906), p. 281 ; Hayata, Fl. Mont. Form. in op. cit. vol. xxv. (1908), p. 174.

M. Oldhami, *Hemsl.*, species unica.

Herba hispidula, caulibus gracilibus adscendentibus 20–75 cm. altis. *Folia* longe petiolata, tenuia, oblongo-lanceolata vel ovata, saepius leviter obliqua, cum petiolo usque ad 25 cm. longa, utrinque attenuata, remote irregulariterque dentata. *Flores* flavi (*Henry*), circiter 4 cm. longi, in racemos densiusculos terminales 25–30 cm. longos subsecundos dispositi ; pedicelli calycem aequantes ; bracteae lineari-lanceolatae, acutae, pedicellos aequantes vel longiores. *Calyx* circiter 1 cm. longus, pilis 1–4-cellularibus apice glandulosis extus undique vestitus ; lobi acuti, apice glandulosi. *Corolla* circiter 4 cm. longa, puberula. *Capsula* calyce inclusa. *Semina* numerosissima, circiter 0·5 mm. longa.—*Rehmannia*? *Oldhami*, Hemsl. loc. cit.

Formosa. Famsui, *Oldham*, 400 ; between Kimpaoli and Pachena, very rare, growing on dripping rocks under the shade of coarse rank vegetation, *Hancock*, 4 ; summit of Ape's Hill, growing on side of vertical rocks in caves and darkish situations, *A. Henry*, 311, 1052.

This plant, originally described from incomplete material, was referred to *Rehmannia* (*Scrophulariaceae*), with some doubt because, as was then remarked, "the distinctly one-celled ovary pointed to the order *Gesneraceae*." Further material of the species, with ripe seeds and fruits, found among Mr. Henry's specimens, made it clear that the proper position of *Rehmannia*? *Oldhami* is in *Gesneraceae-Cyrtandreae*. Accordingly the plant has been renamed and referred to a new genus (*Matsumuria*) of this order, in compliment to Professor Matsumura, the distinguished Japanese botanist, who has done much to encourage the investigation of the Flora of Formosa.

539. **Ennealophus**, *N. E. Brown*, gen. nov. [Iridaceae-Moraceae] ; affinis *Tigridiae*, Ker, sed ramis styli tricristatis (nec bifidis et subulatis) valde differt.

Perianthii segmenta libera, inaequalia, late unguiculata ; exteriora unguibus patentibus, lamina reflexa ; interiora multo minora, unguibus incurvo-erectis, lamina reflexo-patente. *Stamina* 3 ; filamenta in tubum connata ; antherae ad apicem tubi subsessiles, patentes. *Stylus* ad apicem trifidus ; rami in cristas 3 oblongas fimbriato-dentatas divisi, duabus interioribus collateralibus erectis, tertia supra antheras patente, basi utrinque puncto stigmatico instructa.

E. amazonicus, *N. E. Brown*, species unica.

Bulbus 2·2 cm. longus, 1·3 cm. crassus, ovoideus, laevis, brunneus. *Caulis* 40–45 cm. altus, simplex, glaber. *Folia* 4,

subremota, 15–31 (supremum 5) cm. longa, 8–16 mm. lata lineari-lanceolata, subulato-acuminata, trinervia, plicata, glabra. *Spathae bracteae* 2, convolutae, acutae, 2 cm. longae, circa 6 flores circumdantes. *Pedicelli* 2·8–3·8 cm. longi, graciles, glabri. *Ovarium* 4 mm. longum, trigonum, glabrum. *Perianthium* 3·7 cm. diam., coeruleo-violaceum, unguibus pallide brunneis et segmentis interioribus ad basin laminae maculo albo triangulo ornatis, glabrum ; segmenta exteriora 1·8–2 cm. longa, 1·7–1·8 cm. lata, sublate unguiculata, laminis cuneato-obovatis apice late rotundatis integris ; segmenta interiora multo minora, latissime unguiculata, unguibus late cuneato-obovatis concavis basi patentibus deinde incurvo-erectis superne contiguis, laminis abrupte reflexo-patentibus 11 mm. longis 9–10 mm. latis obovatis apiculatis vel abrupte acutis basi contractis obsolete denticulatis. *Stamina* monadelphia ; tubus 3 mm. longus, brunneus ; antherae 4 mm. longae, patentissimae, sagittatae, loculis coeruleis. *Stylus* 3·5–4 mm. longus ; rami 5 mm. longi, basi 4-alati, superne tricristati ; cristae oblongae, fimbriatae, violacae, duae interiores erectae, tertia supra antheras patentissima utrinque cum puncto stigmatico ad basin disposito.

Brazil. Described from a living plant imported "from the Upper Amazon River" by Mr. H. A. Tracy of Twickenham.

This plant much resembles *Tigridia violacea*, Schiede (*Bot. Mag.* t. 7356), in appearance, size and colour of the flowers, but is entirely different from *Tigridia* and all other genera in the structure of its style-branches.

540. **Polypodium callophyllum**, *C. H. Wright* [Filices-Polypodiaceae] ; species *P. trichomanoidi*, Sw., affinis, soris saepi bini dispositis differt.

Planta humilis. *Rhizoma* ascendens, gracile, sparse pilosum. *Frondes* 6 cm. altae, 6 mm. latae, alte pinnatim lobatae, pilis albis 1–2 mm. longis undique vestitae, pallide virides, basi in stipitem brevem dense pilosum attenuatae ; lobi oblongi, apice rotundati, basi inferiore decurrente ; nervi laterales inconspicui, indivisi. *Sori* saepe bini alter ad basin, alter prope medium lobum affixi ; sporangia pluria.

Perak : Gunong Hijan, 1070 m., on rocks, *Fleet-Surgeon C. G. Matthew, R.N.*

LII.—THE AMERICAN SPECIES OF MICROTROPIS.

T. A. Sprague.

The genus *Microtropis* (*Celastraceae*) was described for the first time in 1837 by Meissner (Gen. p. 68), and more fully by Arnott in 1839 (Ann. Nat. Hist. vol. iii. p. 152). At the end of 1896, 11 species were recognised, all of which were natives of the Indo-Malayan region. In 1897, however, Loesener described a new species of *Microtropis* from Costa Rica (Bot. Gaz. vol. xxiv. p. 393); and in 1900, another from Mexico (Engl. Jahrb. vol. xxix. p. 98). Three more American species are now added, bringing the total number of species to 16, five of which are natives of Mexico and Central America.

Discussing the problem presented by the distribution of *Microtropis*, Loesener (Engl. Jahrb. vol. xxiv. p. 198) suggested that the genus

might be polyphyletic, or, alternatively, that it originally inhabited a region far to the north of its present area of distribution, as is known to have been the case in numerous genera now confined to North America and the Chino-Japanese region.

The great similarity between the Central American *Microtropis occidentalis* and the Indian *M. discolor* renders a polyphyletic origin extremely improbable ; whereas the montane character of *Microtropis*, and the wide distribution of many of the genera of *Celastraceae* favour the view that the area of the genus formerly extended further to the north.

KEY TO THE AMERICAN SPECIES.

Pedicels filiform :—
- Pedicels about 2 mm. long ; leaves drying brown, lateral nerves oblique, conspicuous on the lower surface, reticulation indistinct ... ... 1. *parviflora.*
- Pedicels about 5 mm. long ; leaves drying grey, lateral nerves patulous, not conspicuous, reticulation distinct and very close ... ... 2. *filipes.*

Pedicels stoutish :—
- Cymes three or four times forked, many-flowered, branching divaricate ... ... 3. *Schiedeana.*
- Cymes once or twice forked, few-flowered, branching not divaricate :—
  - Leaves oblanceolate, 4–6 cm. long, coriaceous ... ... 4. *guatemalensis.*
  - Leaves elliptic, 7–11 cm. long, chartaceous 5. *occidentalis.*

1. **M. parviflora**, *Sprague*, comb. nov.——*Euonymus parviflorus*, Hemsl. Diagn. Pl. Nov. pars i. p. 6 ; Biol. Centr.-Amer., Bot., vol. i. p. 188.

NICARAGUA. Chontales, *Tate*, 292.

The ovary was described doubtfully as 4-celled. It is, however, 2-celled, as in the other species of *Microtropis*.

2. **M. filipes**, *Sprague*, sp. nov.

Ramuli sub angulo acuto adscendentes, graciles, tetragoni, subalati, internodiis 1·5–3·5 cm. longis. *Folia* elliptica vel ovato-elliptica, apice breviter acutissime acuminata, basi obtuse cuneata, 3–7 cm. longa, 1·2–3·7 cm. lata, minute denticulato-serrata, chartacea, utrinque cinerea, margine leviter recurvo, nervo medio supra prominulo subtus prominente, lateralibus prominulis utrinque circiter 6 satis patulis, reticulatione venularum densa distincta ; petioli 1·5–3 mm. longi. *Cymae* 1·5–3 cm. longae, ter vel quater furcatae, 15–31-florae, minute patenter puberulae ; pedunculi filiformes 0·5–2 cm. longi ; rami primarii 3–8 mm., secundarii 0·5 mm. longi, tertiarii obsoleti, ita ut pedicelli fasciculati videntur ; pedicelli filiformes, 4–7 mm. longi ; bracteae primariae subulatae, 1·5 m.m. longae, extra puberulae, secundariae et tertiariae primariis minores, pro rata latiores. *Flores* tetrameri, anthesi plena circiter 4·5 mm. diametro, pauci simul expansi. *Sepala* patula, transverse elliptica, vix 0·75 mm. longa et 1 mm. lata, extra densiuscule puberula. *Petala* patentia, suborbicularia, vix 2 mm. diametro. *Discus* inter

filamenta valde 4-lobus, 0·75 mm. diametro. *Filamenta* 0·3–0·4 mm. longa ; antherae vix 0·2 mm. diametro. *Gynaecium* in toto circiter 0·4 mm. longum, ovario stylum aequante a disco occluso. *Fructus* rugosulus, 1 cm. longus (an immaturus ?).

Mexico. Tabasco, in inundated meadows by the river San Sebastian, *Rovirosa*, 264.

3. **M. Schiedeana**, Loes. in Engl. Jahrb. vol. xxix. p. 98.

Mexico. Vera Cruz : Chiconquiaco, between Misantla and Jalapa, *Schiede*.

4. **M. guatemalensis**, *Sprague*, sp. nov.—*M. occidentalis*, Donn. Sm. Enum. pars vi. p. 7, non Loes.

Ramuli satis robusti, brunneoli, teretes, juniores tetragoni, subalati, nitiduli, internodiis 0·5–2·5 cm. longis. *Folia* oblanceolata, apice obtusa, in basin cuneatim angustata, plerumque 4–6 cm. longa, 1·5–2·2 cm. lata, integra, coriacea, discolora, margine leviter recurvo, supra intense, subtus pallide brunnea, nervis medio excepto utrinque satis inconspicuis, nervo medio supra prominulo subtus prominente, lateralibus patentibus vel patulis utrinque circiter 7, venulis inconspicuis ; petioli 4–5 mm. longi. *Cymae* 1–1·5 cm. longae, semel vel bis furcatae ; pedunculi crassiusculi, subtetragoni, 4–6 mm. longi ; rami primarii 2–3 mm. longi, secundarii 1 mm. longi, uniflori, apice bibracteati ; pedicelli vix 1 mm. longi, infra medium articulati ; bracteae semicymbiformes, 1–1·5 mm. longae, margine denticulato brunneo-purpureo. *Flores* tetrameri vel pentameri. *Torus* patelliformis. *Sepala* 2 exteriora 1·5 mm. longa, 2 mm. lata (explanata), brunneo-marginata, interiora duplo majora vel ultra, margine lacerato-ciliato. *Petala* suborbicularia, vix ultra 2 mm. diametro. *Discus* tetragonus vel pentagonus, 2 mm. diametro, ovarium haud occultans. *Filamenta* in angulis disci inserta, 0·5–0·6 mm. longa ; antherae 0·3 mm. longae, 0·5 mm. latae. *Gynaecium* in toto 1·4–2 mm. longum, ovario 1–1·25 mm., stylo 0·5–0·75 mm. longo. *Fructus* ignotus.

Guatemala. Depart. Quiché : Chiul, 2600 m., *Heyde et Lux in Herb. Donnell Smith*, 3088.

5. **M. occidentalis**, Loes. in Bot. Gaz. vol. xxiv. p. 393 ; Engl. Jahrb. vol. xxix. p. 97.

Costa Rica. Prov. Alajuela : volcano Poas, 2700 m., *Donn. Smith*, 6470. Mexico. Vera Cruz : Cumbre del Obispo, between Papantla and Misantla, *Schiede* (ex Loes. l.c. 97).

LIII.—NEW ORCHIDS : DECADE 34.

331. **Pleurothallis attenuata**, *Rolfe* ; inter species sectionis *Apodarum caespitosarum* sepalis et petalis attenuatis facile distinguenda.

Caules secundarii brevissimi, vaginis brunneis obtecti. *Folia* elliptica, minute tridenticulata, basi subattenuata, crassiuscula, 2·5–3 cm. longa, 6–10 mm. lata. *Scapi* graciles, 6–8 cm. longi, 2–4-flori. *Bracteae* tubuloso-spathaceae, apiculatae, 3–4 mm. longae. *Pedicelli* circiter 5 mm. longi. *Sepala* subconniventia, oblongo-linearia, subacuta, circiter 1·7 cm. longa. *Petala* lineari-lanceolata, subacuta, margine pubescentia et prope apicem revoluta, 1 cm. longa.

Labellum recurvum, oblongum, obtusum, minutissime crenulatum, 3–4 mm. longum, medio canaliculatum, prope apicem carinatum, carina papillis erectis instructa. *Columna* arcuata, 2 mm. longa, alis alatis.

Hab. unknown.

Flowered in the Royal Botanic Garden, Glasnevin, in August, 1892, and recently at Kew. The sepals and petals are light green, with a broad dull purple band at the base and a little purple marbling above ; the lip is greenish white. A shallow keel on the front of the lip is furnished with about ten erect papillae, a character not previously noticed in the group.

332. Pleurothallis Birchenallii, *Rolfe ;* a *P. insigni*, Rolfe, floribus multo brevioribus, labelli lobo intermedio lanceolato-oblongo margine copiose tuberculato-hispido differt.

Caules secundarii subgraciles, 4–9 cm. longi. *Folia* elliptico-oblonga, subobtusa, coriacea, 7–10 cm. longa, 2–3 cm. lata. *Scapi* subgraciles, circiter 12 cm. longi, 3–7-flori, basi spatha lanceolata 3 cm. longa obtecti. *Bracteae* tubuloso-spathaceae, acutae, 1 cm. longae. *Pedicelli* 2·5 cm. longi. *Sepalum* posticum lanceolatum, longissime caudato-acuminatum, 5 cm. longum ; sepala lateralia connata, lanceolato-oblonga, caudato-acuminata, 4·5 cm. longa, posticum duplo latius. *Petala* longissime caudato-acuminata, 3 cm. longa, basi latiora, utrinque dente acuto instructa. *Labellum* trilobum, 1 cm. longum ; lobi laterales erecti, falcato-lineares, obtusi, glabri, 6 mm. longi ; lobus intermedius lanceolato-oblongus, apice subacuminatus, margine copiose tuberculato-hispidus. *Columna* lata, 3 mm. longa.

Colombia. Near Velez, *J. Birchenall.*

Flowered in April, 1909, with Mr. J. Birchenall, Alderley Edge, who collected it in the district named. The sepals are dull reddish purple, the dorsal margined with light green at the base, the petals light green striped with brown at the base, the side lobes of the lip greenish white, and the front lobe dull reddish purple.

333. Bulbophyllum nudiscapum, *Rolfe ;* a *B. barbigero*, Lindl., scapis elongatis et labelli capillis haud capitatis facile distinguendum.

Pseudobulbi tetragoni, late oblongi, 2–2·5 cm. longi, vaginis membranaceis ovatis striatis imbricatis vestiti, monophylli. *Folia* oblonga, subobtusa, coriacea, basi attenuata, 11–14 cm. longa, 3–4 cm. lata. *Scapi* elongati, 30–50 cm. longi, vaginis spathaceis paucis et distantibus vestiti ; racemi elongati, multiflori. *Bracteae* elliptico-oblongae, obtusae vel apiculatae, leviter carinatae, 6–9 mm. longae. *Pedicelli* 6–9 mm. longi. *Sepala* subconniventia, ovato-lanceolata, acuminata, circiter 1 cm. longa. *Petala* setacea, circiter 3·5 mm. longa. *Labellum* circiter 1 cm. longum, lineare, basi dilatatum et conduplicatum, apice longe stuposo-barbatum, pilis patentibus et 5–6 mm. longis. *Columna* lata, circiter 2 mm. longa, dentibus falcato-incurvis acuminatis.

Trop. Africa. Sierra Leone, *Afzelius.* Congo, *Mantin.*

Flowered in the collection of M. A. Imschoot, Mont-St.-Amand, Ghent, in August, 1895, and subsequently in several other collections. The sepals are green with dark brown markings at the base ; the copiously hairy lip is purple. The species is remarkable for its much elongated scape.

334. **Eria ochracea**, *Rolfe ;* affinis *E. ferrugineae*, Lindl., sed labelli lobis et cristis integris distincta.

Rhizoma validum, lignosum. *Pseudobulbi* cylindrici, 10–17 cm. longi, vaginis tubulosis imbricatis obtecti, apice 3–5-folii. *Folia* oblonga vel lanceolata-oblonga, subacuta, recurva, subcoriacea, 9–17 cm. longa, 2·5–4 cm. lata. *Scapi* terminales, pubescentes, circiter 10 cm. longi, basi vaginis oblongis obtecti. *Bracteae* patentes, ovato-oblongae, subacutae, 1–1·5 cm. longae. *Pedicelli* 2 cm. longi, pubescentes. *Sepalum* posticum ovato-oblongum, subobtusum, 1·5 cm. longum ; sepala lateralia oblique ovata, subobtusa, recurva, 1·5 cm. longa. *Petala* elliptico-oblonga, subobtusa, erecta, 1 cm. longa. *Labellum* mobile, 3-lobum, recurvum, 1 cm. longum ; lobi laterales angusti, truncati ; lobus intermedius suborbicularis, 7 mm. longus, apice revolutus ; discus carnosulus, laevis. *Columna* lata, circiter 5 mm. longa. *Mentum* obtusum, 6 mm. longum.

Malaya. *Curtis.*

Flowered at Kew in September, 1909. The flowers are greenish yellow, with a slight brownish suffusion and an indistinct brown line on the petals. The plant came out of a mixed lot of orchids which contained also *Dendrobium cruentum*, Reichb. f., and *Bulbophyllum fascinator*, Rolfe, so that the locality is presumably Siam.

335. **Polystachya campyloglossa**, *Rolfe ;* a *P. confusa*, Rolfe, omnibus partibus majoribus, labello valide recurvo et lobo intermedio angustiori distincta.

Pseudobulbi caespitosi, ovoidei, 2–2·5 cm. longi, vaginis membranaceis striatis vestiti, 2–3-phylli. *Folia* oblonga vel lineari-oblonga, minute apiculata, subcoriacea, 5–10 cm. longa, 8–15 mm. lata. *Scapi* erecti, subcompressi, pubescentes, circiter 5 cm. longi, uniflori vel pauciflori. *Bracteae* ovatae, acuminatae, carinatae, pubescentes, 5–7 mm. longae. *Pedicelli* 1 cm. longi, pubescentes. *Sepalum* posticum ovatum, acutum, concavum, puberulum, 1 cm. longum ; sepala lateralia late ovata, acuta, concava, obtuse carinata, puberula, 1·3 cm. longa, 1 cm. lata. *Petala* elliptico-lanceolata, subacuta, 8 mm. longa. *Labellum* trilobum, valide recurvum, 1 cm. longum ; lobi laterales erecti, rotundati, 4 mm. lati, intus glanduloso-puberuli ; lobus intermedius ovato-oblongus, subobtusus, subglaber, 5 mm. longus, basi transverse sulcatus ; discus glanduloso-puberulus, medio crassiusculus. *Columna* lata, 3 mm. longa, pede 6 mm. longo.

Trop. Africa. Mombassa.

Flowered with Messrs. Sander & Sons, St. Albans, in July, 1909. The flowers are green with a brown stain on the foot of the column and base of the lip. The specific name is given in allusion to the remarkably curved lip.

336. **Stanhopea convoluta**, *Rolfe ;* species *S. tricorni*, Lindl., affinis, differt floribus majoribus, mesochilii cornubus oblongis obtusis epichilio duplo brevioribus, nec acuminatis.

Pseudobulbi ovoidei vel ovoideo-oblongi, obscure 5-angulati, circiter 5 cm. longi. *Folia* petiolata, elliptica vel elliptico-oblonga, abrupte acuminata, 5–7-nervia, 30–35 cm. longa, 9–14 cm. lata, petioli circiter 8 cm. longi. *Scapi* breves, vaginis ovatis imbricatis obtecti, biflori. *Bracteae* spathaceae, elliptico-oblongae, subacutae, convolutae, 6 cm. longae. *Pedicelli* 7 cm. longi. *Sepala* subpatentia, elliptico-oblonga, concava, apice recurva et subacuta, 6·5–7 cm. longa, 3·5–4 cm. lata.

Petala conniventia, columnam involventia, ovata, concava, subacuta, 5 cm. longa, 3 cm. lata. *Labellum* trilobum, carnosissimum, 4 cm. longum ; hypochilium subglobosum, 2·2 cm. latum, basi utrinque angulatum vel cornu obtuso instructum, mesochilium breve, esulcatum, bicornutum, antice gibbosum, cornubus incurvis oblongis obtusis 1 cm. longis ; epichilium oblongum, truncatum, 2 cm. longum, 1 cm. latum. *Columna* incurva, 4 cm. longa, subito et late alata.

Columbia. Prov. Antioquia, *Fl. Claes.*

Flowered in the establishment of M. Fl. Claes, Etterbeek, Brussels, in September, 1909. The sepals and petals are ivory white, with buff tips to the latter ; the lip is buff yellow with the interior of the sac orange.

337. **Mormodes revolutum**, *Rolfe ;* a *M. specioso*, Linden, labello margine valide revoluto et supra medium utrinque dente brevi instructo differt.

Pseudobulbi fusiformi-oblongi, 11–13 cm. longi, vaginis membranaceis striatis imbricatis vestiti. *Folia* elongato-lanceolata, acuta, 3–5-nervia, subcoriacea, 15–30 cm. longa, 3–3·5 cm. lata. *Scapi* axillares, circa 10 cm. longi, basi vaginis tubulosis vestiti, 4–6-flori. *Bracteae* ovato-oblongae, obtusae, 5–6 mm. longae. *Pedicelli* 4–5 cm. longi. *Sepala* oblongo-lanceolata, acuminata, apice et margine recurva, 3·5 cm. longa ; lateralia reflexa. *Petala* erecta, oblongo-lanceolata, acuminata, apice et margine recurva, 3·5 cm. longa. *Labellum* oblongum, 3·5 cm. longum, apice acutum et reflexum, margine valide revolutum et supra medium utrinque dente brevi instructum. *Columna* oblique incurva, acuta, 1·5 cm. longa.

Peru. Moyobamba.

Introduced by Messrs. Sander & Sons, and flowered in their nursery at St. Albans in July, 1909, a plant being afterwards acquired for Kew. The sepals and petals are deep buff yellow ; the lip is reddish brown. The specific name is given in allusion to the strongly revolute margins of the lip.

338. **Oncidium anfractum**, *Rolfe ;* ad *O. Reichenbachii*, Lindl., accedit, differt paniculae ramulis valde flexuosis, floribus minoribus et columnae alis late hastatis.

Pseudobulbi oblongi, compressi, paullo sulcati, apice et basi diphylli, 4–5 cm. longi, 2·5–3 cm. lati. *Folia* oblonga vel linearioblonga, subacuta, 13–22 cm. longa, 2–3 cm. lata. *Scapi* subgraciles, flexuosi, circa 1 m. longi, paniculati, paniculis angustis et ramulis brevibus retrofractis flexuosis. *Bracteae* ovato-oblongae, obtusae, 2 mm. longae. *Pedicelli* graciles, circiter 1·5 cm. longi. *Sepala* libera, reflexa, breviter unguiculata, lanceolata, undulata, apice acuta et recurva, 1 cm. longa. *Petala* sepalis paullo latiora, alioquin similia. *Labellum* late panduratum, 1·5 cm. longum ; lobi laterales late oblongi, obtusi, 5 mm. longi ; lobus intermedius subreniformis, obscure bilobus et crenulatus, 1·5 cm. latus ; crista basi quadrilamellata lamellis tridentatis apice dentibus tribus oblongis instructa. *Columna* subreflexa, 5 mm. longa, fronte biauriculata ; alae late triangulari-hastatae, subobtusae, 4 mm. longae. *O. Reichenbachii*, Lindl. Fol. Orch., Oncid. p. 49 (ex parte).

Venezuela. Prov. Merida: Laguneta, 2134 m. alt., *Funck & Schlim*, 1030.

A handsome species with long flexuose inflorescence and bright yellow flowers, with dark brown bars on the sepals and petals and lighter brown blotches on the basal half of the lip. It was confused by Lindley with his *O. Reichenbachii*, a species based on *O. maizaefolium*, Reichb. f. in Bonplandia, 1854, p. 279 (non Lindl.), and has long been known from the original dried specimen. It has now appeared in cultivation, having been sent for determination by Messrs. Hugh Low & Co. in July, 1908.

339. **Saccolabium (Calceolaria) platycalcaratum** *Rolfe;* a speciebus omnibus hujus sectionis calcare dorsaliter complanato differt.

Herba epiphytica, nana. *Folia* oblonga vel elliptico-oblonga, oblique et obscure bidenticulata, crasso-coriacea, 4–6 cm. longa, 1·5–2 cm. lata. *Scapi* axillares, 4–5 cm. longi; racemi breves, 6–9-flori, floribus subcorymbosis. *Bracteae* late ovato-oblongae, subobtusae, 2 mm. longae. *Pedicelli* 1–1·2 cm. longi. *Sepala* et *petala* patentia, elliptico-oblonga, subobtusa, 4–5 mm. longa, viridia, brunneo-maculata. *Labellum* trilobum, 6 mm. longum; lobi laterales lati, truncati, 1·5 mm. longi; lobus intermedius recurvus, suborbicularis, sagittatus, convexus, hirsutulus, albidulus, centro pulvino viridi instructus; calcar basi latum, apice dorsaliter complanatum, didymum, 3–4 mm. longum, apice 2–2·5 mm. latum. *Columna* lata, fere 2 mm. longa.

Upper Burma.

Sent for determination by Messrs. Sander & Sons, St. Albans, in February, 1909. A small-flowered species of the *Calceolaria* section, readily distinguished by the much flattened apex of the spur, though conforming to the group in other respects. The sepals and petals are yellow spotted with brown; the lip is whitish with the fleshy centre to the front lobe green.

340. **Acriopsis latifolia,** *Rolfe;* ab omnibus speciebus *Acriopsis* adhuc notis foliis late oblongis facile distinguenda.

Pseudobulbi aggregati, ovoidei, subcompressi vel obscure hexanguli, 2–4 cm. longi, novelli vaginis equitantibus obtecti, monophylli. *Folia* subsessilia, late oblonga, subobtusa, coriacea, nitida, supra canaliculata, 10–20 cm. longa, 3–5·5 cm. lata. *Scapus* lateralis, patens, simplex, circiter 10 cm. longus. *Bracteae* ovatae, subacutae, 2 mm. longae. *Pedicelli* 4 mm. longi. *Sepala* patentia, oblonga, subobtusa, subconcava, 6–7 mm. longa. *Petala* patentia, linearia, subacuta, 6–7 mm. longa. *Labellum* carnosum, 6–7 mm. longum; unguis cum columna in urceolum latum connatus, 3 mm. longus; lamina pandurato-oblonga, 4 mm. longa, apice biloba, basi lobis lateralibus falcato-oblongis biauriculata; discus dense papillosus et 4-callosus. *Columna* incurva, 5 mm. longa, superne ad latera stigmatis auriculis 2 oblongis incurvis instructa.

Malaya.

A very distinct species, with leaves several times broader than those previously known. The flowers are very light whitish yellow, with red purple stripes and spots on the sepals and petals, and with papillae of similar colour on the disc of the lip. It flowered at Kew in April, 1909; it was received with a number of other species stated to have come from the Straits Settlements.

LIV.—ADDITIONS TO THE WILD FAUNA AND FLORA OF THE ROYAL BOTANIC GARDENS, KEW : X.

PHANEROGAMS.

Rubi.

R. A. Rolfe and A. B. Jackson.

Thirteen species of *Rubus* were recorded as indigenous to the Royal Botanic Gardens by the late Mr. G. Nicholson in 1906 (*Kew Bulletin*, Addl. Ser. V. pp. 78, 79). A study of the extensive thickets in the Queen's Cottage grounds made during August, 1908, convinced us that the list was not complete, and this led to a set of Rubi being collected and forwarded to the Rev. W. Moyle Rogers, the well-known authority on the genus and author of the Handbook of British Rubi. At his suggestion the search was continued during the present season, and a second set was forwarded to him, and his critical notes are here incorporated with our own.

It will be seen that seven additional forms have been obtained, without including two hybrids to be mentioned later, making an aggregate of 20 out of a total of 101 recognised as British in the Handbook ; a very good proportion for so restricted an area. Two of those previously enumerated we have been unable to find, though in one case this probably arises through a change of name, but as no specimen has been found in the Herbarium the point cannot be cleared up. The work in such an intricate genus involved a re-comparison of the whole of the material, both in the grounds and the Herbarium, and as the previous conclusions were to some extent modified, we have included all the forms found, the additions being indicated by an asterisk.

There are two forms which neither Mr. Rogers nor ourselves have been able to identify, which are believed to be of hybrid origin, though we fail to find them among the numerous hybrids recorded by Focke and others. The subject is one on which much has been written, though the widest difference of opinion still exists among batologists. It is certain that some Rubi which have been described as species or varieties are natural hybrids, but no adequate method of testing the question has yet been found. The sterility of certain forms is often accepted as evidence of hybridity, but while probably a very good guide in itself it does not go far enough, for some hybrids which have been raised in gardens between very distinct species are fully fertile, and would be treated as species if found wild and their origin unknown. Such plants usually show unmistakable resemblances to both parents, and if their origin were unknown and the parents belonged to distinct groups, differences of opinion might arise as to which section they should be placed in. Analogous cases appear among British Rubi. Another fact is now known, namely that the offspring of hybrids when self-fertilised may revert more or less in the direction of either or both parents, so much as to obscure their common origin. The principle might be applied to testing the possible origin of certain fertile forms which show such perplexing resemblances to diverse species as to obscure their real affinity.

Certain it is that the British species of *Rubus* often grow intermixed or in close proximity, and that the pollen is widely distributed by numerous industrious bees, as may be observed on any sunny day. The intermediate character of many of the forms and the tendency to vary is notorious, so much so that in some cases it becomes difficult or even impossible to distinguish them. Further, the frequent occurrence of forms intermediate between well-marked species which happen to grow intermixed of itself suggests hybridity, and these intermediate forms often vary more than the well-defined species, and this often in the direction of one or the other of the supposed parents. It is now admitted that a large number of British willows formerly described as species are the result of the intercrossing of a comparatively small number of primary species, and it is not improbable that a similar condition of things obtains in *Rubus*, though the difficulty and intricacy of the subject delays its recognition.

The classification and nomenclature adopted are those of Mr. Rogers' Handbook of British Rubi (1900), and of his supplementary papers in the *Journal of Botany* (1909, pp. 310–318, 340–346). The numbers prefixed are those of the Handbook, and additions are indicated by an asterisk. "Hb. K." and "Arb. Hb." indicate that specimens are preserved in the General or the Arboretum Herbarium at Kew.

Subgenus Idaeobatus, *Focke.*

(1.) **Rubus Idaeus**, *L.* Nicholson records a few clumps in Queen's Cottage grounds, but these now seem to have disappeared : at all events we could not find any.

Subgenus Eubatus, *Focke.*

(Groups 1 and 2, Suberecti and Subrhamnifolii, appear to be absent.)

Group 3. Rhamnifolii.

(14.) **R. carpinifolius**, *Weihe & Nees.* Several bushes found in Queen's Cottage grounds, and showing a certain amount of variation. Hb. K., Arb. Hb.

(22.) **R. dumnoniensis**, *Bab.* Nicholson records this as here and there in Queen's Cottage grounds. We have only succeeded in finding a single bush on the towing-path side of the ha-ha, which Mr. Rogers considers to be correctly named. We have not seen a specimen of Nicholson's plant. Hb. K.

(23.) **R. pulcherrimus**, *Neum.* Abundant in Queen's Cottage grounds. Probably the commonest of the Kew brambles, and one of the handsomest when in flower. Aptly named. Hb. K., Arb. Hb.

Group 4. Villicaules.

(27.) *R. gratus, *Focke*, var. **sciaphilus**, *Lange.* Queen's Cottage grounds ; not common. Of specimens collected in August, 1908, Mr. Rogers remarks : "Except for the stronger stem-prickles and

the nearly bald stem, these two sheets seem identical with Danish specimens of *R. sciaphilus*, Lange, now in my Herbarium. I have the same thing from 7 Western Counties (Welsh and English), but I have not seen it before from East England." Hb. K.

Group 5. Discolores.

(31.) *R. Godroni, *Lecoq. & Lamotte* (*R. argentatus*, P. J. Muell.). Collected in Queen's Cottage grounds in August, 1908, and a few bushes seen again this year. Mr. Rogers has confirmed the identification. There is a specimen in the Arboretum Herbarium, collected in Queen's Cottage grounds in 1899 and left unnamed, which is certainly identical. Hb. K., Arb. Hb.

(32.) R. rusticanus, *Merc.* Nicholson records this as occurring here and there by towing-path, where only we have found it. The double-flowered variety (var. *flore pleno*) occurs near Queen's Cottage, but only as a cultivated plant.

Group 6. Sylvatici.

(37.) R. macrophyllus, *Weihe & Nees.* Nicholson records this as abundant in Queen's Cottage grounds, but we have not come across any bush which can be assigned to any form of that variable species, nor can we find a dried specimen of it. The plant may possibly be included here under another name.

Group 7. Vestiti.

(43.) *R. hypoleucus, *Lefv. & Muell.* (*R. micans*, Gren. & Godr.). Found in several spots in Queen's Cottage grounds in August, 1908. Mr. Rogers remarks : " I think a highly glandular and aciculate form of this." Hb. K.

(47.) *R. leucostachys, *Schleich.* Here and there in Queen's Cottage grounds. A piece collected in August, 1909, was sent to Mr. Rogers, who marked it : " Probably *R. leucostachys* × *rusticanus*, though in panicle nearer to *R. leucostachys* than is usual in this hybrid." But we find quite identical forms under *R. leucostachys*, and as *R. rusticanus* is absent from the Queen's Cottage grounds we incline to call it simply *R. leucostachys.* Hb. K.

Group 8. Egregii.

(53.) R. mucronatus, *Blox.* Nicholson records this as not uncommon along borders of plantations in Queen's Cottage grounds, where we have also gathered it. A piece collected in August, 1909, and forwarded to Mr. Rogers was returned marked : " I suppose certainly a *mucronatus* form (? *f. umbrosa*) with foliage less hairy than usual, and exceptionally long petiolule to terminal leaflet." Hb. K.

(55.) *R. anglosaxonicus, *Gelert.* An unusually vigorous form was collected in the Queen's Cottage grounds in August, 1909, of which Mr. Rogers remarks : " The panicle is rather suggestive of a hybrid origin, but there seems little room for doubt that the stem pieces belong to *R. anglosaxonicus.*" Hb. K.

Group 9. Radulae.

(61.) *R. radula, *Weihe*. A few bushes in the Queen's Cottage and Kew Palace grounds. In both cases Mr. Rogers agreed as to the determination, though suggesting that the latter showed an approach to *R. anglosaxonicus raduloides*, Rogers, in one direction and to *R. mutabilis*, Genev., in the other. Hb. K.

(62.) R. echinatus, *Lindl.* Fairly common and quite typical in Queen's Cottage grounds. One of our most distinct brambles and locally common. Hb. K.

(63.) R. rudis, *Weihe & Nees*. Common in open places in Queen's Cottage grounds, and found also on the strip by the side of the towing-path. Hb. K., Arb. Hb.

(66.) R. podophyllus, *P. J. Müll.* [or form between it and *R. oigocladus*, P. J. Müll. & Lefv.]. Queen's Cottage grounds. Nicholson records a form so named by Mr. Rogers, of which there is a specimen in the Arboretum Herbarium. We found an identical bush in August, 1908, and Mr. Rogers felt some doubt about the correct identification. Hb. K., Arb. Hb.

Group 10. Sub-Koehleriani.

(70.) *R. Lejeunei, *Weihe & Nees*, var. ericetorum, *Lefv.* A specimen collected in the Queen's Cottage grounds in August, 1908, was returned by Mr. Rogers with the remark: "Looks to me nearer to *R. ericetorum*, Lefv., than to *R. mucronatus*, Blox., but it seems rather peculiar and not in a very good condition for determination." Hb. K.

Group 11. Sub-Bellardiani.

(80.) R. foliosus, *Weihe & Nees*. Nicholson records this as common in shade in Queen's Cottage grounds, and there is a specimen in the Arboretum Herbarium. We found only a few examples of it in 1908 and none in 1909. Hb. K., Arb. Hb.

Group 12. Koehleriani.

(81.) R. rosaceus, *Weihe & Nees*, var. hystrix, *Moyle Rogers*. Very common in shady places. Mr. Rogers writes: "I know this form well, having seen a great deal of it since I first met with it in the Witley neighbourhood in 1890. It has long seemed to me curiously intermediate between *R. rosaceus* and *R. pallidus*, Weihe & Nees, and I agree with Mr. Marshall in considering it to be the common sand form of *R. rosaceus* throughout S.W. Surrey. It is especially abundant in the Haslemere district and the contiguous parts of S.W. Sussex and N. Hants. I have also seen it at Woburn, Beds." A very common and characteristic form at Kew, frequently with very narrow leaves. Hb. K., Arb. Hb.

(Group 13, Bellardiani, appears to be absent.)

Group 14. Caesii.

(101.) R. caesius, *L.* Nicholson records this as found on the strip by the side of the towing path, where only we have found it.

Hybrids.

A few bushes were found which we were unable to name, and these are considered to be hybrids of two distinct combinations. They are as follows :—

*R. mucronatus × pulcherrimus ? Borders of thickets in Queen's Cottage grounds. Not rare. Specimens of three different bushes were collected in August, 1909, and sent to Mr. Rogers, and all were determined as above. We had referred them doubtfully to *R. mucronatus*, which on the whole it most resembles, and with which it was probably included by Nicholson. (We do not find this or the next recorded, either by the Rev. E. F. Linton [*Journ. Bot.*, 1907, pp. 271, 272] or by Focke [Asch. & Grabn. Syn. Mitt.-Eur. Fl. vi. pp. 440–648] where many hybrid *Rubi* are mentioned.) Hb. K.

*R. echinatus × rosaceus ? A fine clump of a *Rubus* was found in a thicket in Queen's Cottage grounds in August, 1908, and was collected as *R. fuscoater*, Weihe ? Mr. Rogers replied : " Looks like a hybrid. Not *R. fuscoater*, Weihe." This year we collected abundant material, and sent it with the record that it grew associated with *R. rudis*, *R. rosaceus*, *R. pulcherrimus*, and *R. echinatus*. Mr. Rogers replied : " In all respects looks like a hybrid. The strong development of prickles and the barrenness of all the panicles especially point to such an origin, but I cannot suggest any parents." After a comparison with its associates we think *R. echinatus* × *rosaceus* the most likely combination. The resemblance to *R. rosaceus* is very marked, and except in its longer spines it may be described as fairly intermediate between the two. Hb. K.

Ranunculus auricomus, *L.* A large patch on the side of the path at the back of the Tropical Aroid House. Coll., W. B. Turrill.

Pimpinella magna, *L.* In quantity near the Herbarium. Coll., W. B. Turrill.

Atriplex hastata, *L.* Several plants in broken ground near Kew Palace. Coll., W. B. Turrill.

FUNGI : THIRD SERIES.

G. Massee.

The first addition to the list of *Fungi* occurring in the Royal Botanic Gardens was published in the *Kew Bulletin*, 1906, pp. 46, 47, and the second additional list appeared in the *Bulletin*, 1907, pp. 235–244. Since the last list the following new and additional species have been recorded.

Agaricaceae.

Lactarius, *Fries.*

L. scrobiculatus, *Scop.* On the ground. Q.

Marasmius, *Fries.*

M. Raffillii, *Massee.* *Pileus* primo campanulatus, dein applanato-expansus, margine subincurvus, laevissimus, crassiuscule membranaceus, glaberrimus, pallidissime sordideque flavo-griseus, medio ac super lamellas obscurior, 4–5 cm. diam. *Lamellae* pileo concolores, distantes, antice acutatae, postice attenuato-decurrentes, acie integrae. *Stipes* leviter excentricus, incurvus, tenuis, glaberrimus, tenax, pileo concolor. *Sporae* ellipsoideae, hyalinae, 5 × 3 μ.

On decaying staging in Stove, *C. P. Raffill.*

This species does not conform with European types of *Marasmius*, and is probably an introduced species.

Inocybe, *Fries.*

I. echinata, *Roth.* This fungus has long been known as occurring in hothouses, &c., in different European countries, and has always been considered as an alien. Quite recently it has appeared in quantity on the trunk of a fern just received from New Zealand, which may prove to be its native home.

Thelephoraceae.

Cyphella, *Fries.*

C. Berkeleyi, *Mass.* On dead sedge. A. (G. Nicholson.)

Tremellinaceae.

Exidia, *Fries.*

E. albida, *Bref.* On dead oak branch. A.

Gymnoascaceae.

Arachinotus, *Cohn.*

A. aureus, *Cohn.* On dead beech branch. A. (G. Nicholson.)

Sphaeriaceae.

Cucurbitaria, *Gray.*

C. elongata, *Grev.* On *Robinia hispida.* A.

C. bicolor, *Fckl.* On *Prunus sinensis* and *P. japonicus.* A.

Lophiostoma, *Ces. & De Not.*

C. ulicis, *Nke.* On gorse. A.

Diaporthe, *Nits.*

D. vepris, *Fckl.* On bramble. Q.

Rosellinia, *De Not.*

R. pulveracea, *Fckl.* Dead wood of *Crataegus.* Q.

R. liginaria, *Grev.* On furze. A.

Melanomma, *Fckl.*

M. nudum, *Sacc. & Speg.* On dead branches of *Tamarix tetrandra.* A.

Didymosphaeria, *Fckl.*

D. epidermidis, *Fckl.* Dead wood. Q.

Gibbera, *Fries.*

G. vaccinii, *Fries.* On dead branches of *Genista aetnensis.* A.

Hypocrea, *Fries.*

H. gelatinosa, *Fries.* Dead wood. Q.

Pleospora, *Rabenh.*

P. gymnocladi, *Baguis.* On *Gymnocladus canadensis.* A.

Gibberella, *Sacc.*

G. Saubinetii, *Sacc.* On dead twigs of *Gleditschia sinensis.* A.

Discomycetes.

Belonidium *Mont. & Dur.*

B. Jerdoni, *Berk.* On dead wood. A.

Dasyscypha, *Fries.*

D. leuconica, *Mass.* On dead stem of *Calluna.* A. (G. Nicholson.)

D. ascuna, *Mass.* On dead stem of *Calluna.* A. (G. Nicholson.)

D. ciliaris, *Sacc.* On barked wood of fallen beech. A.

Godronia, *Karsten.*

G. callunigena, *Karsten.* On dead stem of *Calluna.* A.

Echinella, *Sacc.*

E. setulosa, *Mass. & Crossl.* On dead stem of heather. A.

Cenangium, *Fries.*

C. abietis, *Rehm.* On dead wood of *Pinus montana.* A.

Orbilia, *Fries.*

O. succinea, *Quelet.* On a dead elder branch. A. (G. Nicholson.)

Deuteromycetes.

Phoma, *Fries.*

P. amorphae, *Sacc.* On *Amorpha fruticosa.* A.

P. melaena, *Mont.* On *Lychnis dioica.* Q.

Diplodia, *Fries.*

D. rhois, *Sacc.* On branches of *Rhus glabra.* A.

D. cercidis, *Ellis & Everh.* On *Cercis canadensis.* A

D. siliquastri, *West.* On *Cercis Siliquastrum.* A.

Diplodina, *West.*

D. malvae, *Togu.* On dead stem of *Sidalcea* sp. A.

Septoria, *Fries.*

S. tecomae, *Ellis & Everh.* On *Tecoma radicans.* A.

Pestalozzia, *De Not.*

P. funerea, *Lib.* On dead *Cryptomeria japonica.* A.

Chromosporium, *Corda.*

C. aureum, *Sacc.* On dead oak wood. A.

Chaetostroma, *Corda.*

C. atrum, *Sacc.* On rachis of *Cladrastis tinctoria.* A.

Septocylindrium, *Bon.*

S. Bonordeni, *Sacc.* On stem of *Vitis inconstans.* A.

Verticillium, *Nees.*

V. albidum, *Sacc.* On gorse. A.

V. quaternellum, *Grove.* On ripe blackberry. A.

Fusarium, *Link.*

F. album, *Sacc.* On old bast matting. A.

Bispora, *Corda.*

B. pusilla, *Sacc.* On old bast matting. A.

Periconia, *Bon.*

P. nigrella, *Sacc.* On dead beech branches. Q.

Hymenula, *Fries.*

H. Berkeleyi, *Sacc.* On fallen fir cones. Q.

LV.—DIAGNOSES AFRICANAE: XXXII.

1051. Nemesia lilacina, *N. E. Brown* [Scrophulariaceae-Hemimerideae]; affinis *N. parviflorae*, Benth., sed ramis numerosissimis, bracteis reflexis, floribus purpureo-lilacinis et capsulis oblongis valde diversa.

Herba annua, 20–37 cm. alta, profuse ramosa, corolla excepta ubique tenuiter et minute glanduloso-pubescens. *Rami* angulati, inferne subteretes, adscendentes vel subpatentes. *Folia* 2–3·5 cm. longa, 4–6 mm. lata, anguste lanceolata vel superiora linearilanceolata, acuta vel obtusa, dentata. *Racemi* 9–28 cm. longi, laxi. *Bracteae* reflexae, 2–5 mm. longae, sessiles, cordato-ovatae, acutae. *Pedicelli* patentes, graciles, 9–13 mm. longi. *Sepala* 2–2·5 mm. longa, oblonga vel lineari-oblonga, subacuta. *Corolla* (palato labii inferioris excepto) glabra; labium superius 3·5 mm. longum, 5–7 mm. latum, 4-lobum, lilacinum, atropurpureo-striatum, lobis oblongis, obtusis; labium inferius infra palatum reflexum, 3–4 mm. longum, 5–6 mm. latum, rotundatum, integrum, pallide purpureo-lilacinum, palato subtuberculato luteo-maculato; calcar 3–3·5 mm. longum, dorsaliter compressum, obtusum, albidum. *Capsula* 5–7 mm. longa, 3·5–4 mm. lata, oblonga, apice emarginata.

German South-West Africa. Hereroland; near Okahandya, *Dinter.*

Described from a living plant sent to Kew in August, 1909, by Messrs. Haage & Schmidt, who raised it from seed sent to them by Mr. Dinter in October, 1906.

1052. **Plectranthus Bolusii**, *T. Cooke* [Labiatae - Ocimoideae]. *Caules* erecti. *Verticilli* non-pedunculati 4–6-flori. *Corolla* 8·5 cm. longa ; tubus fere rectus.

Caules erecti, obtuse quadrangulares, simplices vel ramosi, foliosi, pilosi. *Folia* lata, ovata, acuta vel obtusa, viridia, supra sparse pilosa vel glabra, infra ad nervos pilosa, plus minusve irregulariter serrata, 2·5 cm. longa, 2 cm. lata ; petiolus 4–8 mm. longus. *Inflorescentia* in racemos terminales simplices vel paniculatos 10–15 cm. longos disposita ; verticilli 4–6-flori, fere 1 cm. distantes ; bracteae ovatae, acuminatae. *Pedicelli* vix 4 mm. longi, pubescentes. *Calyx* 4 mm. longus, coloratus, tubuloso-campanulatus, pubescens ; dens superior 1·5 mm. longus, 1 mm. latus, ovatus, acutus ; dentes 2 laterales breves, oblongi, obtusi, cuspidati ; dentes 2 infimi quam laterales multo longiores, lanceolato-subulati. *Calyx* (fructifer) fere 1 cm. longus, saepe coloratus, tubuloso-campanulatus, fere glaber. *Corolla* 8·5 mm. longa ; tubus 5 mm. longus, fere rectus, cylindricus ; labium superius 3 mm. longum et latum, apice rotundo crenulato ; labium inferius 3·5 mm. longum, 1·5 mm. latum, naviculare, acutum. *Stamina* inclusa.

South Africa. Transvaal ; Petersburg District near Potgeiter's Rust, 1100 m., *Bolus*, 11011 ; Houtbosch, *Rehmann*, 6167.

This belongs to Sect. *Coleoides*, Benth.

A more robust fruiting specimen in Herb. Kew (the flowers of which are said by Wood to be purple) with larger leaves, from a hill near Weenen, Natal, 1200 m. (*Wood*, 4488), is probably a well-grown plant of this species.

1053. **Plectranthus Cooperi**, *T. Cooke* [Labiatae-Ocimoideae]. *Erecta. Folia* deltoideo-ovata. *Inflorescentia* in racemos longos disposita ; verticilli haud vel breviter pedunculati.

Planta erecta. *Caulis* obtuse quadrangularis, pubescens. *Folia* deltoideo-ovata, acuta vel acuminata, grosse et subirregulariter serrata, supra et ad nervos infra sparse pubescentia, ad 9 cm. longa et 7·5 cm. lata ; foliorum infimorum petiolus 5·5 cm. longus, foliorum superiorum brevior, plus minusve pubescens. *Inflorescentia* in racemos ad 25 cm. longos simplices vel paniculam formantes disposita ; rhachis scaberula, pilis glandulosis ; verticilli 6–12-flori, saepe fere 2·5 cm. distantes, non vel breviter pedunculati ; bracteae 2–3 mm. longae, glanduloso-pubescentes. *Calyx* (florifer) 2·5 mm. longus, coloratus, pubescens. *Calyx* (fructifer) 6 mm. longus, curvatus, fere glaber, saepe purpurascens ; dens superior fere 2·5 mm. longus, ovatus, acuminatus, erectus ; dentes caeteri e basi deltoidea subulati ; 2 dentes infimi quam laterales longiores. *Corolla* angusta, pars tubi basalis 1·5 mm. longa, 1 mm. lata, acute deflexa ; pars superior supra partem angustam fere cylindrica, dilatata, 5 mm. longa, 2 mm. lata, basi saccata ; labium superius 3 mm. longum ; labium inferius 4 mm. longum, fere 2 mm. latum, naviculare, acutum. *Stamina* exserta. *Nuculae* 1·5 mm. diametro, subglobosae, compressae, laeves, luteae.

S. Africa. Orange River Colony, *Cooper*, 2982. Natal, *Gerrard*, 1673 ; Byrne, in bush, 900 m., *Wood*, 1843. Zululand, *Gerrard*, 1673.

Belongs to Sect. *Coleoides*, Benth.

1054. Plectranthus densiflorus, *T. Cooke* [Labiatae-Ocimoideae]; *Plectanthro villoso*, T. Cooke, subsimilis, sed foliis orbicularibus petiolatis et corolla lutea (non lilacina) differt.

Suffrutex. Caules robusti, pubescentes. *Folia* 5 cm. longa et lata, orbicularia, obscure crenata et utrinque molliter villosa, basi cuneata, in petiolum brevem decurrentia. *Inflorescentia* paniculata, racemis spiciformibus 25 cm. longis dense villosis; verticilli multiflori, densi; bracteae ovato-lanceolatae, acutae, deciduae, 3 mm. longae, 1·5 mm. latae, a tergo pubescentes, marginibus ciliatis. *Pedicelli* 2 mm. longi. *Calyx* 2·5 cm. longus; dens superior 0·5 mm. latus; dentes caeteri 4 subaequales vel infimi minores, oblongi, ciliati. *Calyx* (fructifer) 4·5 mm. longus, campanulatus, rectus, villosus; dens superior 2·5 mm. longus, 2 mm. latus, ovato-oblongus, subacutus, ciliatus; dentes 2 laterales 3 mm. longi, ovato-oblongi, acuti, ciliati; dentes 2 inferiores similes sed minores. *Corolla* lutea (*Wood*); tubus 3 cm. longus, fere rectus, supra dilatatus. *Nuculae* fere 1 mm. longae, 0·5 mm. latae, laeves, nitidae, pallide brunneae.

S. Africa. Natal; near the Mooi River, 900–1200 m., *Wood*, 4475.

This belongs to Briquet's section *Stachyanthi*.

There is but one specimen in the Kew herbarium.

1055. Plectranthus Peglerae, *T. Cooke* [Labiatae-Ocimoideae]; *P. Galpinii*, Schlecht., affinis, sed foliis basi cuneatis, non cordatis vel truncatis, pedicellis longis, bracteis et calycis dente superiore differt.

Planta alta. *Caules* erecti, fere glabri, purpurei, sulcati. *Folia* late ovata, acuminata, grosse irregulariterque serrata, saepius superne glabra, inferne in nervis pubescentia et glandulis notata, basi cuneata, 7·5–20 cm. longa et ad 10 cm. lata; petiolus 2·5–7·5 cm. longus, glaber vel pubescens. *Inflorescentia* ad 30 cm. vel ultra longa, racemis simplicibus, laxe paniculatis; flores purpurei; verticilli 6-flori, 1–1·5 cm. distantes, non pedunculati; bracteae 3 mm. longae, ovato-lanceolatae. *Pedicelli* 8 mm. longi, filiformes. *Calyx* (frutescens) 8·5 mm. longus, curvatus, fere glaber; dens superior 1·5 mm. longus, ovatus, obtusus; dentes caeteri 4 subulati, 2 infimi quam laterales duplo longiores. *Corolla* 10 mm. longa; tubus parvus, superne infundibuliformis; labium inferius 5 mm. longum. *Stamina* exserta. *Nuculae* 2 mm. longae et basi 1·5 mm. latae, ovoideae, luteae.

S. Africa. Natal and Zululand, *Gerrard*, 1235; Transkei, Kentani, *Miss Pegler*, 377.

Belongs to Sect. *Coleoides*, Benth.

1056. Plectranthus villosus, *T. Cooke* non *Sieber* [Labiatae-Ocimoideae]; *P. marrubioidi*, Baker, facie subsimilis, sed calyce, cujus dens superior quam dentes inferiores duplo longior, omnino differt.

Suffrutex. Caules erecti, robusti, pubescentes. *Folia* sessilia, obovato-oblonga, obtusa, obscure crenata, utrinque dense villosa, basi cuneata, 2·5 cm. longa. *Inflorescentia* in racemos multos spiciformes paniculam formantes disposita; verticilli multiflori, villosi, densi; bracteae late ovatae, acutae, utrinque villosae, 6 mm.

longae et latae. *Pedicelli* fere 2 mm. longi. *Calyx* dense villosus, 2 mm. longus; dens superior quam caeteros duplo longior, 0·5 mm. latus, ovato-oblongus, subacutus, dense ciliatus; dentes caeteri 4 subaequales (vel 2 infimi minores), oblongi, quam dens superior multo breviores, dense ciliati. *Corolla* lilacina (fide *Wood*), 5 mm. longa, medio deflexa, supra flexuram dilatata; labium superius 1·5 mm. longum; labium inferius 2 mm. longum, 1 mm. latum, naviculare. *Stamina* superiora 1·5 mm. longa; stamina inferiora 3·5 mm. longa. *Stylus* 3·5 mm. longus. *Nuculae* 1 mm. longae et latae, angulares, pallide brunneae, laeves, nitidae.

S. Africa. Zululand; Entumeni, 600–900 m., *Wood*, 3955.

This belongs to Briquet's section *Stachyanthi*.

There is but one specimen in the Kew herbarium.

1057. **Plectranthus zuluensis**, *T. Cooke* [Labiatae-Ocimoideae]. *Caules* erecti. *Folia* parva, glabra. *Verticilli* non pedunculati, 4–6-flori. *Corollae* tubus rectus. *Pedicelli* 3 mm. longi.

Herba tenuis. *Caules* obtusi, quadrangulares, puberuli. *Folia* ovata, acuta, basi truncata vel breviter cuneata, fere glabra, marginibus regulariter serratis, 2·5–4 cm. longa et 2·5 cm. lata; petiolus 0·5–2 cm. longus, puberulus. *Racemus* terminalis, simplex, 6–11 cm. longus; verticilli 4–6-flori, 6–10 mm. distantes, non pedunculati; bracteae 3–4 mm. longae, obovatae, acuminatae. *Pedicelli* 3 mm. longi. *Calyx* 4 mm. longus, campanulatus, pubescens; dens superior 1 mm. longus, late ovatus, subacutus; dentes laterales 1 mm. longi, deltoidei, acuti; dentes 2 inferiores quam laterales duplo longiores, lanceolati, acuti. *Corollae* tubus fere rectus, subcylindricus, fere 6 mm. longus, supra partem angustam saccatus; labium superius 4 mm. longum et 3 mm. latum, 3-lobatum, obovatum, apice rotundum. *Stamina* exserta. *Nuculae* haud visae.

S. Africa. Natal and Zululand, *Gerrard*, 1675.

There are but two small pieces of this plant in the Kew herbarium.

Belongs to Sect. *Coleoides*, Benth.

1058. **Pogostemon Rogersii**, *N. E. Brown* [Labiatae-Satureineae]; species africana unica.

Herba erecta, 45 cm. alta, ramosa, corolla excepta ubique dense villoso-tomentosa, ramis adscendentibus. *Folia* deflexa, 1·5–2·5 cm. longa, 5–10 mm. lata, ovato-lanceolata vel oblongo-lanceolata, obtusa, basi rotundata, petiolo 2–3 mm. longo. *Spicae* 2–4 cm. longae, densae. *Bracteolae* filiformes, 3 mm. longae. *Calyx* campanulatus, 3 mm. longus, 5-nervis, aequaliter 5-dentatus, dentibus deltoideis acutis. *Corolla* exserta, roseo-purpurea; tubus 3–4 mm. longus, cylindricus; limbus subaequaliter 4-lobus, lobis 3 posticis ovatis obtusis in labium posticum 2 mm. longum approximatis, lobo antico 1·5 mm. longo ovato acuto integro. *Stamina* 4, aequalia, longe exserta, 5 mm. longa, apice decurva; filamenta medio longe barbata; antherae 1-loculares. *Discus* breviter columnaris, apice truncatus. *Stylus* apice bifidus.

Rhodesia. Dam near the railway, about 2114 miles from Cape Town, in water, 1300 m. alt., *Rogers*, 8314.

This is the first species of this genus to be recorded from Africa, and is quite distinct from all the Asiatic species.

1059. **Nepeta Wellmanii**, *C. H. Wright* [Labiatae-Nepeteae]; *N. robustae*, Hook. f., affinis, habitu laxiore et foliorum nervis pagina inferiore vix prominentibus differt.

Caulis erectus, lignosus. *Rami* ascendentes, virgati, dense tomentosi. *Folia* ovata vel ovato-rotundata, 2·5 cm. longa, 1·8 cm. lata, subacuta, basi rotundata, crenata, utrinque pilosa, infra punctato-glandulosa; nervi laterales utrinque circa 5, arcuati. *Cymae* plures ad ramorum apices in paniculam spicatam 2 cm. longam congestae. *Calyx* 6 mm. longus, tubulosus vel anguste campanulatus, extra sericeo-tomentosus; dentes subulati, tubo aequilongi, subaequales. *Corolla* extra hirsutus; tubus subcylindricus, 7 mm. longus; labium posticum erectum, concavum, obscure crenatum, 4 mm. longum; labium anticum patens, 4 mm. longum, lobus terminalis subacutus, lobi laterales rotundati. *Stamina* brevia, erecta. *Discus* crassus. *Nuculae* ellipticae.

Angola. Benguella; Bailundo District, 1500 m., *Dr. F. C. Wellman.*

1060. **Cleistanthus Johnsonii**, *Hutchinson* [Euphorbiaceae-Phyllantheae]; a speciebus africanis adhuc descriptis foliis non acuminatis differt.

Arbor magna. *Rami* leviter sulcati, glabri, cortice incano; ramuli juniores breviter pubescentes, innovationibus fere tomentosis. *Folia* oblonga vel oblongo-elliptica, apice obtusa vel rotundata, basi leviter rotundata, 2·5–6·5 cm. longa, 1·3–3 cm. lata, membranacea, utrinque glabra, nervis lateralibus utrinque 4–8 prominentibus; petioli rugosi, parce pubescentes, 5–7 mm. longi; stipulae deciduae. *Racemi* multiflori, floribus ♀ quam ♂ paucioribus plerumque inferne; pedicelli graciles, usque ad 2·5 cm. longi, puberuli. *Gemmae* ellipsoideae, obtusae, circiter 4 mm. longae, parce puberulae. *Flores* ♂ quam ♀ multo numerosiores: *Sepala* oblonga, apice leviter cucullata, subacuta, 4 mm. longa, extra puberula. *Petala* oblonga, fere teretia, 1 mm. longa. *Discus* glaber. *Filamenta* 2 mm. longa; antherae 3 mm. longae. *Ovarii rudimentum* parvum, glabrum, tripartitum, ramis intus concavis. *Flores* ♀ pauci; *Sepala* quam ♂ paulo longiora. *Petala* spathulata, apice dentata. *Discus* glaber. *Ovarium* subglobosum, 3 mm. diametro, glabrum; styli 3, breviter bifidi, glabri, lobis patulis. *Capsula* alte triloba, circiter 1·3 cm. longa, exocarpio crustaceo leviter rugoso glabro pallido, endocarpio corneo. *Semina* solitaria, ambitu irregularia, circiter 5 mm. diametro.

Tropical Africa. Portuguese East Africa; Sofala, large tree growing on the borders of mangrove swamps near the sea, *Johnson*, 26*b*.

Var. **pubescens**, *Hutchinson*; a typo ovario et fructibus junioribus dense flavo-pubescentibus differt.

In the same locality, *Johnson*, 26*a*.

The species and variety are remarkably similar, the latter differing only in the ovary and young fruit which are densely yellowish pubescent.

ZIZANIA AQUATICA.

[*To face page* 381.

LVI.—THE CANADIAN WILD RICE.

(*Zizania aquatica*, Linn.)

W. J. Bean.

Fringing the shallow margins of many of the lakes and rivers of Eastern North America is the remarkable grass yielding the grain commonly known there as "wild rice." For ages before the advent of Europeans it was, no doubt, an important item in the food supply of the North American aborigines, and even to-day, notwithstanding the numerous cereals that have been introduced, it is calculated that 30,000 of the North American Indians find in it their chief farinaceous food. It is an annual aquatic plant growing only in fresh water, and its habitats generally may be compared to those of the common reed (*Phragmites communis*) in Europe. It grows in similar dense fields, invading soft muddy bottoms where the depth of water does not exceed 2, or at most 3, feet. As seen under cultivation at Kew, it is a stately grass with stems standing 9 to 12 feet above the water when grown in good soil. The narrow, pointed leaves are 2 to 4 feet in length, 2 to 2½ inches wide about the middle, and of a deep, vivid green. In full blossom this grass is strikingly handsome, every stem being crowned with a large panicle of flowers 1½ to 2½ feet long, and about two-thirds as much wide. The male flowers are confined to the lower part of the panicle in graceful arching racemes, the females to the upper part on stiffer ones. Each panicle is borne on a naked, terete, erect, polished green stalk as long as the flowering portion, thus making it, stalk and all, 4 feet and upwards in length. Apart from any economic value it may possess in Great Britain, this plant is certainly worthy of cultivation for its beauty alone in shallow ponds and ornamental tanks. Some forms have panicles narrower in proportion to their length than those whose measurements are here given.

So remarkable and useful a plant naturally attracted the notice of early travellers. Peter Kalm, the Swede, who traversed a considerable part of Eastern North America between 1748 and 1751, mentions it several times in his "Travels"; and Jonathan Carver, who journeyed over part of the same country between 1766 and 1768, makes some interesting and quaint observations about it. He says that it is

> "the most valuable of all the spontaneous productions of that country. Exclusive of its utility as a supply of food for those of the human species who inhabit this part of the continent and obtain it without any other trouble than that of gathering it in, the sweetness and nutritious quality of it attracts an infinite number of wild fowl of every kind which flock from distant climes to enjoy this rare repast, and by it become inexpressibly fat and delicious."

Although the seed, or "rice," as prepared for food by the North American Indians is said to be highly esteemed by white men, and is, indeed, eaten as a "breakfast* cereal" in Minnesota and other

* Messrs. Brown and Scofield, in a useful article on the *Zizania* in Bulletin No. 50 of the U.S. Department of Agriculture, 1903, state that "the entire available supply of wild rice now sells at from two to three times the price of ordinary white rice."

States where the plant most abounds, it is on its use as a food-plant for duck and other edible wild fowl that its value as an economic plant chiefly depends. To-day, just as in Carver's time, myriads of birds migrate to the wild-rice fields at the ripening of the seed, there to feast and fatten gloriously for a few weeks.

The desirability, either from the point of view of food or that of sport, of establishing so valuable a plant in the fresh waters of the British Isles, and thereby augmenting the food supply of our native waterfowl, need not be emphasized. This is by no means the first time the idea has been mooted. In a paper on the *Zizania* read by Mr. A. B. Lambert before the Linnean Society, December 6, 1803, the author observes that "in a pond at Spring Grove [Isleworth] Sir Joseph Banks has a great quantity of this plant growing annually, ripening its seeds and sowing itself round the edges, and I am persuaded that it might be sown with some advantage where no other grain will grow in many shallow pieces of water in Great Britain and Ireland, especially in the latter country." (Transactions of the Linnean Society, vol. vii., p. 264, fig. 13.) Whether any attempt was ever made to carry out this idea is not stated, but if so, it would not appear to have been permanently successful, for, in course of time, *Zizania aquatica* quite disappeared from cultivation in the British Isles. It was re-introduced about 12 years ago to Kew, where it has since been cultivated, but merely as an interesting and ornamental plant. Shortly thereafter a sustained attempt at its introduction was undertaken by Lord Walsingham.

It has been thought worth while to attempt its acclimatisation in the most likely parts of Great Britain and Ireland, and for this purpose Kew has recently imported from Canada and distributed a considerable quantity of seeds. Among those who have kindly consented to assist the establishment by co-operating in this attempt have been the following :—

Mr. H. C. Baker, Oaklands, Almondsbury, Bristol.
Rev. M. C. H. Bird, Brunstead Rectory, Stalham, Norfolk.
Mr. J. Bonhote, Gadespring, Hemel Hempstead, Herts.
Mr. C. J. Cookson, Trelissick, Truro.
Mr. H. Harmsworth, Horsey Hall, Great Yarmouth.
Lord Iveagh, Elvedon Hall, Thetford, Suffolk.
Mr. E. Kay Robinson, Warham, Norfolk.
Mr. T. A. Dorrien-Smith, Tresco Abbey, Isles of Scilly.
Mr. W. Smith, Hill House, Surlingham, Norwich.
Lady Smythe, Ashton Court, Bristol.
Mr. W. F. Tremayne, Carclew, Perranarworthal, Cornwall.
Sir A. P. Vivian, Bosahan, St. Martin, Cornwall.
Lord Walsingham, Merton Hall, Thetford, Suffolk.
Mr. J. C. Williams, Caerhays Castle, St. Austell, Cornwall.
Mr. J. H. Buchanan, Leny, Callender, Perthshire.
Sir J. Gladstone, Bart., Fasque, Laurencekirk, Kincardineshire.
Mr. D. J. Macpherson, Glentrium, Newtonmore, Invernessshire.
Rev. J. E. Macrae, Lochinver, Lairg, Sutherlandshire.
Lord Barrymore, Fota, Co. Cork.
Earl of Kenmare, Killarney House, Co. Kerry.
Marquis of Lansdowne, Derreen, Co. Kerry.
Col. Davis Cooke, Colomendy, Mold, Flintshire.
Miss Talbot, Margam Park, Port Talbot, Glamorgan.

Cultivation.

The *Zizania* presents not the least difficulty in its cultivation when once its requirements are known. The most important particular is the preservation of the seed during winter. It is absolutely essential that *it should be kept moist*. In a state of nature the seed falls into the water when ripe and sinks at once (or very shortly) to the bottom, there to remain throughout the winter and until it germinates the following spring. Kept dry, its vitality rapidly decreases. Sir Joseph Banks failed several times to introduce the seed alive in a dry state, but at last succeeded when some was sent to him from Canada in jars of water. Ninety years later, his experiences had passed out of mind, and dry seed was again several times sent to Kew from North America, which invariably failed to germinate. Finally, a consignment of young plants packed in wet moss was received and they grew freely. The seed of the plants grown at Kew is now gathered when ripe, at once immersed in water and kept there throughout the winter either in a jar, or tied up loosely in canvas. As the seed is heavier than water, and sinks naturally, it may be kept in an open vessel. For reasons of convenience and safety the seed is usually kept under cover, either in the tank of a cool house, where in the ordinary course of work the water is continually being changed, or in an outhouse where the water is changed once or twice a week. But a pond or tank out-of-doors would do equally well. It does not apparently matter how cold the storing place is. It has been found in North America that seeds kept through the winter in water frozen into a solid block of ice part of the time, germinated quite well.

Whilst it is undoubtedly the safest method to keep the seed permanently immersed throughout the winter, it can, apparently, be kept in air for a week or two without losing its vitality entirely. Some seed was imported from Canada in May, 1909, which we were informed had been kept damp from the time it was collected. It was packed for transmission in such a way as to retain moisture, and some of the seed which was sown on arrival germinated very well. The rest was spread out to dry and a fortnight later a second batch was sown. The percentage of germination was then found to have decreased by about two-thirds. A third batch was sown two weeks later (or a month after arrival), and not one seed germinated. Of seed gathered at Kew and stored in water, from 90 to 95 per cent. germinate.

The mode of raising the plants at Kew is as follows :—About the middle of March seed is sown in 2½-inch pots of loamy soil (two seeds to each pot in case of one failing), the seed being barely covered with soil. The pots are immersed in pans of water deep enough to cover them, and placed in a cool greenhouse. By the middle of May the plants, having been once repotted, are eight to twelve inches high and they are then planted, about 1 foot apart in rich soil, at one corner of the Lily Pond (*see* illustration), the soil being from 4 to 8 inches below the surface of the water. Beyond protecting the plants by wire-netting from waterfowl (which are very fond of the fresh young leaves) no further attention is needed until the ripe seed has once more to be gathered. When planted

thinly a single plant will develop a " stool " of twenty or more flowering stems. The seeds are sown in pots merely for convenience in handling. Where large numbers were dealt with, it would be simpler and better to sow them in shallow boxes of soil plunged in water.

Whether *Zizania aquatica* is capable of establishing itself permanently in the British Isles is uncertain. From time to time surplus plants have been planted on the banks of the lake and in the ha-ha which separates the Kew Arboretum and the Queen's Cottage Grounds from the banks of the Thames, and left to take their chance ; yet although they have often grown and flowered well, I have never seen a single plant the following season. Still, circumstances at Kew are not favourable for an experiment of this kind. The lake and the ha-ha are emptied of water and more or less cleaned every winter, and unless protected, both the seeds and young seedlings are exposed to the attentions of the ornamental water-fowl. But even in the Lily Pond, where the plants have been watched and guarded, our experience has not been particularly encouraging, for when left to itself the *Zizania* has rarely survived more than two seasons. A considerable quantity of ungathered seeds fall into the water every autumn, which germinate freely enough the following spring, but so late are they and so slowly do the plants grow in the early stages that they appear to be unable to produce good seed, except after unusually long and warm summers. It is for this reason that we find it necessary to raise young plants under cover, and to hasten them through their early stages as described above. Lord Walsingham, who has grown the *Zizania* at Merton Hall, Thetford, in Suffolk, for some years, informs us that his experience in this respect is similar.

There are, of course, many places where the conditions are more favourable than at Kew, and where an experiment in acclimatising this plant can be carried out on a sufficiently large scale. Its capabilities in this respect can only be definitely ascertained when this is done. Mr. Lambert, in 1803, suggested Ireland as a likely place for its naturalization, and there are undoubtedly many spots on the margins of the western lakes, and in the backwaters of the rivers, where the soil and depth of water are perfectly suited for the *Zizania*. There remains, however, the important factor of climate, and especially sunshine. The plant grows naturally where the winters are severe and the summers very hot. Our winter conditions are quite favourable ; for the seeds, as has already been stated, can pass through the winter months embedded in ice. It is in the lack of summer heat that the difficulty will probably be found to lie.

Judging by the behaviour of this plant at Kew it ought to thrive in the marshes and broads of Norfolk and Cambridgeshire. There are also suitable conditions in the wet lowlands of Kerry, particularly the Killarney districts. An excellent place for experiments with this plant is the Isle of Wight, where in the lowlands between Sandown, Brading and Bembridge on the east, and in the upper reaches of the Medina river, there are large areas of shallow water over mud which would afford suitable

conditions for a water-loving annual grass. Sunny areas should be chosen, and the larger they are the better will be the chances of success.

The depredations of water-fowl and perhaps water-rats may have to be guarded against, and for safety's sake a quantity of seeds should be gathered each autumn and kept immersed in water until sowing time.

The Rev. M. C. H. Bird, Brunstead Rectory, Stalham, Norfolk, reports that he has made several attempts to establish Canadian Rice in the broads and dykes of Norfolk, but either the seeds were devoured by water voles, or the young plants were worried by aquatic birds.

The only wild bird at Kew that appears to have discovered the value of the *Zizania* seeds as a food is the sparrow. I have frequently disturbed a flock of perhaps twenty of them feeding on the seeds of the group of plants here illustrated. But, according to Lord Walsingham's experience, ducks also, when they find the fallen seed, eat it greedily.

Our illustration is from a photograph of a group of plants of *Zizania aquatica* growing at the edge of the Lily pond in the Royal Botanic Gardens, Kew.

LVII.—THE MANCHURIAN WATER-RICE.

(*Zizania latifolia*, Turcz.)

Otto Stapf.

With *Zizania aquatica*, L., the American Wild Rice or 'Water-Rice,' another grass, of Asiatic origin, is very frequently confounded. It has for some time been in cultivation at Kew and in a few places on the Continent as *Hydropyrum latifolium*.

The grass in question was first mentioned—by name only—as a distinct species by Turczaninow in his "Catalogus plantarum in Regionibus Baicalensibus et Dahuria sponte Crescentium" (in *Bull. Soc. Imp. Nat. Mosc.* 1838, No. 1, p. 105) in 1838, he having found it five years previously in lakes between the rivers Shilka and Argun in Eastern Siberia. The name given in the Catalogue is '*Zizania latifolia*'; but the specimens of Turczaninow's collection were distributed as '*Limnochloa caduciflora*, Turcz.,' and it was under this latter name that Trinius referred to the grass in his paper on the *Oryzeae* (in *Mém. Acad. St. Pétersb.* sér. vi. vol. v. Bot. p. 185). Whilst admitting that the Siberian plant differed in certain particulars from the American *Zizania aquatica*—or as he called it *Hydropyrum esculentum*—viz. in the fimbriate ligule, the awned male spikelets and the slender pedicels of the female spikelets, he was not certain whether these differences were sufficient to entitle the Siberian grass to rank as a distinct species. On the other hand Grisebach, who was the next to deal with it (in *Ledebour, Flora Rossica*, vol. iv. p. 466), described it as *Hydropyrum latifolium*, distinguishing it from its American congener by the awned male spikelets. Steudel also described it as a distinct species under the name of *Zizania dahurica*, and Turczaninow himself in

his Flora Baicalensi-Dahurica (vol. ii. part i., pp. 289, 290), insisted on its distinctness. Maximowicz (*Primit. Fl. Amur.*, p. 327) and Regel (*Tent. Fl. Ussur.*, p. 171) also followed Grisebach, and so did most later writers, until Bentham (in *Bentham and Hooker, Genera Plantarum*, vol. iii., p. 1115) expressed the opinion that *Zizania latifolia*, Turcz., and *Z. aquatica*, L., do not differ. He emphasised this view in his 'Notes on Gramineae' (in *Journ. Linn. Soc.* vol. xix., p. 54) by saying that "the typical *Z. aquatica*, Linn. . . . includes the East-Russian and Japanese *Z. latifolia*, which is absolutely identical with some North-American specimens." Hackel (in *Engl. & Prantl, Nat. Pflanzenf.* vol. ii., part ii., pp. 40, 41) also admits only one species in *Zizania*, i.e. *Z. aquatica*, adding that the Asiatic form is a mere variety. The 'Index Kewensis,' the 'Index Florae Sinensis' (Rendle in *Journ. Linn. Soc.* vol. xxxvi., p. 345), and recent Japanese floras (e.g. *Matsumura, Ind. Plant. Japon.* vol. ii., p. 87) all enumerate the Asiatic 'Water-Rice' simply as *Zizania aquatica*. It is, however, noteworthy that all those who have seen the two grasses in the wild state, or have had practical experience of them under cultivation, look upon them as distinct plants. Hance, who published a paper on the Asiatic 'Water-Rice' in the Journal of Botany for 1872 (p. 146), and Paillieux and Bois in their valuable 'Potager d'un Curieux' (p. 89), treat the Asiatic grass as a distinct species, and the former gives specific reasons for doing so. Korshinsky, who collected it himself on the Amur, follows Grisebach; and Komarow although he enumerates it as *Zizania aquatica* var. *latifolia* (*Flor. Mandshur.* vol. i., pp. 261, 262) insists upon its structural distinctness and its geographical isolation.

It is no doubt justifiable theoretically to reduce the two Water-Rice grasses to a common ideal type, but as we know them in their present state and for practical purposes they certainly represent two perfectly distinct forms, which we may conveniently designate 'species.'

Hance, who knew the Asiatic water-rice well in the living state, has given a fairly good account of the characters wherein this grass differs from its American congener; but as his paper has been little noticed, it may be useful to point out these differences once more and more fully.

Innovation and duration.—It is well known that *Z. aquatica* is an annual even under conditions which would seem to favour a prolonged duration. The young plant early develops vegetative buds in the axils of the basal leaves which grow up intra-vaginally into leaf-bearing culms. All or most of the culms of a bunch flower towards the end of the summer, mature their seeds in the autumn, and then die down. The juvenile state of *Z. latifolia* is not known; but in the adult state it is characterized by the presence of stolons which persist as rhizomes. The latter are described by Hance as being "as thick as a swan's quill, or of even twice that diameter. These rhizomes run to some length, and are clothed at the nodes, where they put forth stout fibres, with three ovate-lanceolate tough membranous semi-transparent scales,* embracing their entire

* These scales can hardly be called 'tough'; they are rather thin and split readily, which probably misled Hance into stating that there are three of them in association with each node.

circumference, those nearest the collum being about an inch long." In the few specimens taken up at Kew, the rhizomes were about 1 cm. in diameter and up to 8 cm. long. The stolons (at the end of October) were rather more slender and somewhat shorter, with numerous crowded scales at their tips and small vegetative buds in the scale axils. These stolon-tips would in the next season grow into bunches of leaf-shoots and throw out from their base other stolons. The stolons appear to persist as rhizomes through several seasons, connecting the leaf bunches which have sprung from them. There is no doubt that the stolons and rhizomes often grow much larger. There is, for instance, a stolon in one of Turczaninow's specimens quite 15 cm. long, although the tip is broken off, and Balansa describes the rhizomes of the Tonkin specimens as 'long and stout.' A copious supply of roots is developed from the nodes of the rhizomes as well as from those of the base of the shoots, some of them attaining 2–3 mm. in diameter and usually densely clothed with root fibres.

Culms.—Turczaninow describes the culms of *Z. latifolia* as "orgyales" and taller than those of *Z. aquatica*; but the latter also attain to similar dimensions, although there occur forms which are not higher than 40–50 cm. The internodes of the underground and overground stems of *Z. latifolia* are hollow and divided into chambers by numerous thin diaphragms. Similar diaphragms are also found in the culms of *Z. aquatica*, but they are more delicate and often break down.

Leaves.—There is little difference in the shape and size of the leaves of *Z. latifolia* and of robust states of *Z. aquatica*, the blades of the latter attaining up to 6 cm. in width. In fact, the only palpable differential character as regards the leaves of the two is connected with the ligule. This is firmer and longer in *Z. latifolia*, and ciliolate along the margins. It might be described as ovate-acuminate with a bifid tip and up to 2·5 cm. long, whilst the ligule of *Z. aquatica* is more delicate, particularly in the upper hyaline portion, and therefore becomes soon lacerated. It is also more bluntly rounded off and shorter.

Inflorescence and Distribution of Sexes.—It is well known that in *Z. aquatica* the two sexes are distinctly separated, the male spikelets being confined to the lower pseudowhorls of the panicle, and the female to the upper. Moreover, during flowering, the male branches spread horizontally, while the female part of the panicle is more or less contracted, the branches being erect (the uppermost) or obliquely erect. After flowering the branches remain in this position, or the female become rather more oblique. This is, however, only true of the flowering panicle on the living plant. If cut and allowed to dry up, the panicle contracts rapidly, and particularly the female branches erect themselves so as to be closely adpressed to the main axis. Such states are commonly seen in herbaria. In *Z. latifolia* the tendency towards a similar separation of sexes is manifest, but it does not assert itself to the same degree. The lower pseudowhorls, it is true, bear male spikelets, but the upper have male and female spikelets with a preponderance of the latter which occupy the middle and upper parts of the

branches. Occasionally female spikelets also terminate the otherwise male branches of the lower whorls. As to the direction of the branches, the herbarium specimens, if cut from flowering or fruiting plants in their early stages when the joint cushions at the base of the branches are still active, cannot be relied upon. Such panicles are in fact as much contracted as similar panicles of *Z. aquatica*. But Turczaninow and Hance state from observation in the field that the lower branches of *Z. latifolia* are spreading (patentes). They do not, however, appear to remain so as the panicle matures. At least, a specimen collected by Balansa (*Pl. de Tonkin*, no. 4727) in the fruiting state has all the branches suberect or (the uppermost) erect. Turczaninow has remarked the fact that the pedicels of the female spikelets of *Z. latifolia* are much more slender than those of *Z. aquatica*. This is indeed one of the most conspicuous differential characters. He might have added, that the reverse is the case with respect to the pedicels of the male spikelets, which in *Z. aquatica* often are almost capillary. In other words, the differentiation of the male and female pedicels is much more accentuated in *Z. aquatica* than in *Z. latifolia*. This is particularly noticeable if the clavate tips of the pedicels be compared.

Spikelet.—The tips of the pedicels of both sexes and in both species terminate in a membranous cupula, the homologue of the two basal glumes which in *Oryzeae* tend so generally towards extreme reduction or complete suppression. In *Z. aquatica* this cupula is perfectly glabrous; in *Z. latifolia*, however, it is minutely ciliolate and puberulous on the back. The same difference is repeated in the following pair of glumes which in an equally reduced condition surround the base of the deciduous part of the spikelet. Grisebach's phrase, "callus (sc. spiculae) membranula in cilia fere ad basin soluta cingitur," refers to it. In the female spikelet this 'membranula' consists of two distinct membranous ciliate truncate scales, whilst in the male it is only indicated by a narrow sparingly hairy rim; in *Z. aquatica* on the other hand it is perfectly glabrous in both sexes. The fifth (fertile) glume and its valve are, sex for sex, very similar in both species except for the fact that the male spikelets of *Z. latifolia* are generally more or less awned, the bristle-like awn varying from one-fifth to the full-length of its glume; rarely it is reduced to a mere cusp. In *Z. aquatica* it is usually absent, the glume ending with an acute point; but in some specimens it is found to be drawn out into a fine, bristle-like mucro. Not much stress should therefore be laid on this feature taken by itself. The lodicules, stamens, and pistils of both species fail to afford any character that may be relied on for discrimination. Hermaphrodite spikelets occasionally occur in both species.

Grains.—The only grains which I have seen of *Z. latifolia* are those of Balansa's specimen (*Pl. de Tonkin*, no. 4727). They are linear oblong and 5 by 1 mm. If this should prove to be their normal condition, they would indeed be easily distinguishable from the slender linear, long (9–15 mm.) grains of *Z. aquatica*.

Distribution.—*Z. latifolia* seems to have its home in Manchuria from the Amur to Korea and eastwards to Japan. It is also recorded from the neighbourhood of Pekin, but whether it occurs

there or in any part of China proper in the wild state is uncertain. Bretschneider (in *Paillieux et Bois*, l.c., p. 90) says it is grown at Pekin as a vegetable, and (*Bot. Sin.*, ii., p. 159) cultivated throughout China for its stalks ; but Hance, who received specimens collected near Pekin from Swinhoe, mentions that locality as if it were in the natural area of the plant. He also says that it is cultivated on the Yantse Kiang and occurs in South China in that state only. On the other hand, Su sung, the author of an illustrated Chinese Materia Medica of the 11th century, states, according to Bretschneider (*Bot. Sin.*, iii., p. 351), that it is common in rivers, lakes and swamps, and especially refers to the marshes of Che Kiang. The Rh ya i (an appendix, probably of the 13th century, to the Rh ya, a dictionary of terms) also mentions the marshes of Che Kiang as a station of the grass, adding that it affords excellent fodder for horses. In Formosa, it exists, according to A. Henry (*Trans. As. Soc. Japan*, vol. xxiv., suppl. p. 107), only in the cultivated state, and its occurrence in Tonkin (*Balansa, in Journ. de Bot.*, vol. iv., p. 161) on the banks of the Grand Lac of Hanoi, and in the Shan States (Abdul Khalil in Herb. Kew.), is also due to cultivation, and possibly subsequent establishment in a subspontaneous state.

Cultivation.—*Zizania latifolia*, has been in cultivation in China as a vegetable for a very long time. Bretschneider (*Bot. Sin.*, part iii., 1893, p. 350, 351) traces its use in that form back to the 10th century. Its Pekin name, according to the same authority, is Kiao paï tsaï (Kiao cabbage) or Kiao sun (Kiao shoots). Simon (in *Paillieux & Bois, Potager d'un Curieux*, p. 93) has "Kao-pać" as the Mandarin name, and "Co-ba" as the common Shanghai vernacular. He also gives interesting particulars concerning the cultivation of Co-ba. There are two varieties, the Co-ba of Fou Tcheou (Foo Chow) and that of Shanghai. The former does not produce stolons, and yields two crops annually. It is cultivated regularly on flooded ground, and propagated by planting the young suckers which form at the base of the shoots in manured mud. The common or Shanghai Co-ba makes stolons very freely, and establishes itself when once planted. For that purpose the Chinese pull the tufts up between the middle of November and the middle of December, expose them to the sun for a few days, and plant them in stagnant or running water with a muddy bottom. After this the next crop will be ready in about ten months time. The vegetable as it is brought to market consists, according to Hance, of "cylindrical pieces, of a white colour, 2½ to 3½ inches long, and 1 to 1½ inches in diameter, tapering upwards into a conical point, and surrounded and surmounted by the leaves and culm from which they are readily detached. In taste the raw shoot is not unlike a half-ripe nut; but it is never eaten uncooked, but by the Chinese is stewed with meat, and by foreigners cut longitudinally into two or three pieces, well boiled and served with melted butter."

A short note on the cultivation of this Water-Rice in Tonkin is contained in the eighth volume of the 'Bulletin Économique' for Indo-China (1905, pp. 1098–1100). According to it a form of *Zizania latifolia* is cultivated on a large scale at the village of Van ho near Hanoi. In Annamese it is called 'cu nieng' or 'cay

lua mieu,' and it evidently corresponds to the Co-ba of Shanghai. It is sold in bundles or packets of ten at about 2 cents per packet from the first days of October to the beginning of January. From the figure on p. 1100 it appears that the lower portions of the stems up to about 15 cm. from the base are sent to market; but very probably only the lower swollen portion, about 1·5 cm. thick, is eaten.

The Co-ba seems to flower very rarely (E. Simon, l.c., p. 93), and it is probable that the barren plants of *Z. latifolia* at Kew, mentioned below, belong to a kind of Co-ba. In the wild state *Z. latifolia* flowers and fruits freely, and the grains were in ancient times much valued as food (Bretschneider, *Bot. Sin.*, iii., p. 352). In the Pen ts'ao Kang mu, the great Chinese Materia Medica and Natural History of the 16th century, the grass is even spoken of as a cereal (Bretschneider, l.c. iii., p. 352) under the name of Ku mi, *i.e.*, Ku grain, Ku being the old Chinese name of *Zizania latifolia*. Siebold (*Syn. Plant. Oecon. Jap.*, 1827, no. 368) also reports the use of the grain for making flour in Japan and especially mentions Mino and "Cosjuu" (Kotsuke?) as the Provinces where the *Zizania* is grown for that purpose. It is figured as "Makomo" (*Hydropyrum latifolium*) in the "Useful Plants of Japan," published by the Agricultural Society of Japan, vol. ii., fig. 346. In the English text to this publication (p. 94) it is stated that "the seeds are used as food, and the new sprouts are also edible." A further note on p. 4, says "the seeds of this plant mixed with rice are consumed as food by boiling." To avoid confusion it may be observed that 'Makomo' is referred in the English text on p. 4, no. 17^b, to *Zizania aquatica*, but in the corresponding place in the Japanese "Contents and Indices" (p. 2, no. 17^b) to *Hydropyrum latifolium*.

Z. latifolia at Kew.—This grass has for many years been grown on the margins of the lake, and in the collection of aquatic plants in the Herbaceous Department. It forms perennial rhizomes which grow in mud or loamy soil partly or wholly submerged, spreading about, and sending up every year tufts of leaves 4 to 5 feet long. None of the plants has ever been known to flower at Kew. It appears quite capable of holding its own in association with such neighbours as *Iris Pseudacorus*, *Typha angustifolia*, *Acorus Calamus*, etc., but owing to an evil habit of turning yellow and dying at the leaf tips, it has a rather shabby appearance except when the leaves are quite young. Whatever its value as a vegetable may be it has little to recommend it as an ornamental grass in this country, and although it can be cultivated with less trouble than *Z. aquatica* should never be preferred to it on this ground.

LVIII.—MISCELLANEOUS NOTES.

Miss J. J. Clark.—On the results of the recent competitive examination in connection with the vacancy on the Herbarium staff, Miss J. J. Clark, B.Sc., has been appointed by the President of the Board of Agriculture and Fisheries to the post of Assistant in the Royal Botanic Gardens, Kew.

Major Henry Alfred Cummins, C.M.G., F.L.S., who acted as Assistant for India in the Herbarium at Kew during the absence of Mr. J. F. Duthie in 1906, has, we understand, been appointed Professor of Botany, University College, Cork.

Mr. C. W. Smythe.—We regret to have to record the death of Mr. C. W. Smythe, Agricultural Superintendent, Sierra Leone, on October 15th, shortly after his return to England on leave. Mr. Smythe entered the Royal Botanic Gardens, Kew, in March, 1900, and left in 1904 to take up the duties of Curator of the Botanic station in Sierra Leone (*K.B.* 1904, p. 13), and subsequently was appointed Agricultural Superintendent.

He had been deputed to visit the forests and forestry schools in Germany during his present leave, and was about to proceed to the continent when he was overtaken by his fatal illness.

Césare Chantre.—In the person of M. Césare Chantre there passed away, on August 8th last, at Rocher, near Lamastre, Ardèche, France, an old contributor and frequent visitor to the Kew Museums.

A native of Lyons, where he was born in 1841, he came to London about 43 years ago as representative of a Lyons business house, with which he was connected by family ties. Residing at Haverstock Hill, and spending his whole days in the city, he managed to combine his love of the country—so much as a near London suburb would allow—with his interest in vegetable, animal and mineral products, the richness of which can be estimated only by visits to London's extensive docks, or the commercial sale rooms. These he constantly attended with a keen eye for anything new to commerce, or for any remarkably fine specimens, whether in size or quality. Gums, resins, articles of food, medicine, or manufacture, all had an interest for him, as products of one or the other of the great kingdoms of nature.

It follows, therefore, that when he left London, in 1883, he had got together a large and carefully selected series of specimens, portions of which he freely gave, at different times, to the Kew museums, when he found during his frequent visits, mostly on Saturday afternoons, that the specimens in that collection were not quite so good as his own, or perchance that he possessed specimens which were not represented at all at Kew. M. Chantre was not only a good economic botanist, but he loved a ramble in the open country with vasculum and butterfly net, especially when accompanied by his old friends, the late Mr. George Nicholson and the writer of this notice. It is recorded that on one of his rambles near Harrow he discovered the rare British plant *Teucrium Botrys*, which had been previously known to occur only near Box Hill.

He was elected a Fellow of the Linnean Society on the 2nd May, 1878, and his letter of resignation, owing to his leaving London, was laid before the Council on the 7th June, 1883.

During his long residence in London he became thoroughly accustomed to English habits, and had the greatest admiration for English home life. His geniality and courtesy made him friends wherever he went. He made a journey to China in connection with his business, and returned with numerous specimens and much information regarding them. His business life ended in 1905, when he retired to Lancaster, chiefly on account of his wife's health. He kept up his interest in his old studies, as the following extract from a letter written by him from St. Raphael, to the writer of these notes in February, will show. He says: "What a pity you cannot run down to the Azure Coast. What fine things we would admire together. I would show you so many. I know now the entire coast from St. Tropeze to Vintimille (Italy), having done it all on foot at various times. The region of St. Raphael is the centre of the finest porphyric region of Europe, and the variety of rocks is immense. I have made a fine collection of them these last two years."

He devoted much of his time in his latest days to religious, social and philanthropic works.

J. R. Jackson.

Palo Amarillo (*Euphorbia fulva*, Stapf; syn. *E. elastica*, Altamirana and Rose, not of Jumelle).—Some particulars regarding this plant as a new source of rubber appeared in the *Kew Bulletin*, No. 7, 1907, p. 294. The following supplementary information upon the subject is gathered from an illustrated article on "The Rubber Plants of Mexico" by Dr. H. H. Rusby in "Torreya" Vol. 9, No. 9, September 1909.

From this paper it appears that the "Palo Amarillo" will not grow upon the alluvial plains of Mexico but only on the rocky hill-sides where the drainage is good. The bark is described as being thick and succulent at first smooth and of a light yellowish-green colour. That of the trunk and large branches soon excoriates in large, very thin, papery, translucent sheets of an orange-yellow or orange-red, colour, which impart to the tree a shaggy appearance, and a colour that has given the trunk its vernacular name "palo amarillo" or yellow trunk.

The flowers appear in January or thereabout, before the appearance of the new leaves, and the fruits mature in June and July.

As soon as the bark is wounded, a milky juice exudes which is very irritant and capable of producing violent inflammation of the eyes if it enters them, as it is quite liable to do in spattering, when the tree is cut.

The great value of this tree as a rubber producer lies in its abundance over large areas and the proximity of the trees to one another facilitating collection of the milk, as well as the ease with which it can be propagated and the rapidity of its growth.

All that is necessary for propagation is to thrust the newly-cut branches into the soil, where they practically all grow. From them

the tree reaches its full size in from 5 to 7 years. These considerations appear to incline Dr. Rusby to the opinion that if all other sources of rubber were to fail, this one could probably supply the world's entire requirements.

The properties of the "palo amarillo" rubber are peculiar. Taken by itself it is of only medium quality, but mixed in suitable proportion with other varieties, especially with para rubber it markedly improves them.

J. M. H.

Callitris sinensis.—In Tschirch (*Die Harz und die Harzbehälter*, vol. i., p. 536) there is a paragraph on the resin of *Callitris sinensis*, of which the author says that it is produced in China and used there medicinally as well as technically, adding that it has not yet been examined. As the name *Callitris sinensis* does not appear in the *Index Kewensis*, nor in the *Index Florae Sinensis* (Enumeration of all the plants known from China Proper, &c.) by Forbes and Hemsley, but on the other hand has found its way into certain publications, it seems to be useful to give a brief account of it. The author, responsible for the name, is Dr. L. Soubeiran. He has the following paragraph in his *La Matière Médicale chez les Chinois* (1874, p. 134):

"Callitris sinensis, *jou-yang-zu sian*, Tatarinow, 498; *yun hiang*, F. P. Smith, 1019; *jong-hang-song*, Debeaux. La résine de Sandaraque, un peu plus blanche que celle du mastic, est employée, ainsi que les autres résines, comme stimulant dans le traitement des ulcères (elle fait la chair), comme déodorisant. Elle sert aussi à préservir les vêtements des attaques des insectes."

Turning to Tatarinow's *Catalogus Medicamentorum Sinensium*, (1856), of which there is a manuscript copy at Kew, we find the name rendered by Soubeiran as '*jou-yang*' and '*zu-sian*,' in Chinese characters with the translation:—Sandarach. The same characters are transliterated by Bretschneider in his *Botanicon Sinicon*, vol iii., p. 608, as '*ju hiang*.' Of this Bretschneider says on p. 462. 'Tatar. (Cat. 65) identifies *ju hiang* with *Resina Sandarac*, but, the drug *ju hiang* which I procured from a Chinese drug shop, and which has been examined by Professor Flückiger, was *Olibanum* or Frankincense. The ancient Chinese descriptions agree." In fact, as Bretschneider (*l.c.*) points out, Cleyer had identified *ju hiang* with "Thus" (incense), stating in his *Specimen Medicinae sinicae*, (1682), *Medic. Simpl.* No. 210: "*Jù hiam*. Est *thus*, acro-dulce, ulceribus medetur, creat carnem, sistit dolores, eximitur illi oleum"; and similarly Williams, in his *Chinese Commercial Guide* (1863), p. 93, says: "*Olibanum*, *ju hiang* (*i.e.* milk perfume). Article of import." Flückiger and Hanbury in their *Pharamcographia* (1874), p. 122, also refer "*ju-siang* (*sic*) *i.e.* milk perfume" to *Olibanum* and observe that in 1872 Shanghai imported of this drug no less than 1,360 piculs (181,333 lbs.).

It is now fairly clear how the confusion, and with it the otherwise entirely unsupported name *Callitris sinensis*, arose. Soubeiran, relying on Tatarinow's and F. P. Smith's erroneous identification of *ju hiang* with Sandarach, evidently concluded that this must be the

product of a *Callitris* and, as it was to him a Chinese drug, of a species other than *C. quadrivalvis*—the origin of the usual Sandarach—he named the species *Callitris sinensis*, without any actual knowledge of the plant. The name has thus no foundation whatever, and ought to be dropped altogether.

O. S.

Wolffia denticulata, *Hegelm.*—This species was described by Hegelmaier (*Die Lemnaceen*, p. 133, t. iii., fig. 16–23) in 1868 from specimens found amongst *Lemna minor*, L., collected in South Africa by Krauss. It has not been again observed until recently, when Mr. R. G. Mason, of Upper Tooting, forwarded specimens to Kew, which he had received from a correspondent at Durban, Natal. Hitherto, the exact locality for this plant has been unknown, but as Krauss collected *Lemna minor* in only two places, viz., Zwartkops River in the Uitenhage Division and Umlaas River in Natal, and as the specimens just received come from near the latter place, it seems reasonable to infer that Krauss obtained *Wolffia denticulata* from the Umlaas River. His specimen of *Lemna minor* in the Kew Herbarium from that locality is not mixed with any other plant.

The individual fronds are linear, 3·5 mm. long and $\frac{1}{10}$ to $\frac{1}{8}$ as broad, very thin, entire along the margins, but slightly denticulate at one end. At the other end is a funnel-shaped depression, from the base of which a new frond is produced and grows out in the same straight line as the parent plant, while a second new frond, often arising afterwards by the side of the first, curves outwards and lies alongside the original one; this process is repeated until a bunch of plants is formed. Pigment-cells occur in the epidermis, but are most numerous towards the ends of the plant. There are a few elongated cells in the interior of the frond at the end from which the new fronds arise, but they do not shew either spiral or annular thickening. The flowers are still unknown.

C. H. W.

Botanical Magazine for October.—The Mexican *Cereus amecamensis*, Heese, which has been figured from a plant presented to the living collection in 1900 by Mr. H. J. Elwes, is closely allied to the well-known *C. speciosissimus*, DC., the chief differential characters being that in the former the tips of the growing shoots are pale green instead of a dull purplish tinge, and the flowers are pure white. The species was discovered, growing as an epiphyte, on Iztaccihuatl Mountain, near Amecameca, at about 7,800 ft. above sea-level. *Cissus adenopodus*, Sprague, is a comparatively new species for the introduction of which Kew is indebted to Mr. M. T. Dawe, who sent it in 1905 from the Mufukamata Forest, Uganda. It is distinct and very ornamental, having long trailing stems and red 3-foliolate leaves, which are clothed on both sides with long slender adpressed hairs. Its nearest ally is probably *C. Buchanani*, Planch. *Laurelia serrata*, Bertero, the Huanhuan tree of the southern parts of Chili, belongs to the small order *Monimiaceae*. It is quite hardy in the late Mr. Acton's

garden at Kilmacurragh, Wicklow, where a tree upwards of 40 years old has attained a height of 33 ft. The drawing was prepared from material sent to Kew by Mr. F. W. Moore, of Glasnevin, and was obtained from the fine specimen referred to. *Rhododendron coombense*, Hemsl., is described as a new species belonging to a group of very closely allied forms in which *R. concinnum*, Hemsl., is included. It was raised in the Coombe Wood nursery of Messrs. J. Veitch & Sons from seeds collected in China. *Bulbophyllum campanulatum*, Rolfe, a new species from Sumatra, is a curious and pretty little plant, with pale purplish flowers umbellately arranged on a slender scape which is decurved at the apex. The figure was prepared from a plant which was received from the Brussels Botanic Garden in 1908.

Botanical Magazine for November.—The plants figured are: *Magnolia Delavayi*, Franch., *Pieris formosa*, D. Don, *Cotoneaster moupinensis*, Franch., forma *floribunda*, Stapf, *Cephalotaxus drupacea*, Sieb. et Zucc., and *Kitchingia uniflora*, Stapf. The *Magnolia* is an evergreen species, native of China, where it was collected in Yunnan for Messrs. J. Veitch & Sons, who presented a plant to Kew in 1902. This flowered in July 1908, providing the material for the illustration. At Kew and at Coombe Wood it thrives very well against a wall, and in such a situation passed through the late severe winter uninjured. The *Pieris* is a handsome and floriferous shrub or small tree, which has been in cultivation for upwards of half a century and is often referred to as *Andromeda formosa*. It is a native of India and China. The figure was prepared from a plant raised from seed received from the Royal Botanic Garden, Calcutta, in 1902. It has now reached a height of 4 feet, and flowered profusely in May, 1908. *Cotoneaster moupinensis* comes from Western China where it was first collected by the Abbé David in 1870, and later by a correspondent of Mr. M. L. de Vilmorin, and by Mr. E. H. Wilson when travelling for Messrs. J. Veitch & Son. It is an attractive shrub, with large bullate leaves and brilliant red berries. The form *floribunda* differs from the type in having more numerous flowers to the inflorescence, and *C. bullata*, Bois, is regarded as synonymous. The figure is based on material furnished by a plant presented to Kew in 1905 by Mr. de Vilmorin. *Cephalotaxus drupacea*, from China and Japan, has been in cultivation at Kew for many years, one specimen, that from which the figure was prepared, being 10 feet high and 15 feet through. The *Kitchingia* is a pretty little crassulaceous plant from Madagascar, having terminal, usually solitary rose-coloured flowers, which are about 1 inch long and are inflated-tubular in shape. The Kew plant was raised from a cutting sent by Mr. G. Bouvet, Director of the Jardin des Plantes at Angers.

Agriculture in the Tropics.—Under this title Dr. J. C. Willis, Director of the Royal Botanic Gardens, Ceylon, has recently published an elementary treatise on tropical agriculture. The work is divided into four parts. Part I deals with soil, climate,

transport, tools, &c., concluding with a short chapter on agriculture in the tropics in primitive times and its gradual change to more modern methods.

In Part II the principal cultivations of the tropics are set out in detail, and a large number of the different tropical products are illustrated. Tables are given in many cases of the amounts of the different articles exported, but it is unfortunate that these tables are not carried beyond the year 1905 in most cases, although the book bears the date of publication 1909. Suggestions as to the improvement of tropical production by careful cultivation, hybridization, &c., are made throughout the chapters. It is of interest to notice that in Java, Liberian coffee has been successfully acclimatised up to 3,000 feet by taking the seed a few hundred feet higher up at each generation. The chapters in this part are well arranged, and deal with plants yielding similar economic products. It is, perhaps, somewhat unfortunate that owing to the work being an "Elementary Treatise" the author has not been able to devote greater space to this part of the book. A chapter is occupied with the diseases of plants in the tropics and their treatment, but it is not of sufficient scope to deal with the subject on more than general principles.

Part III contains a general consideration of agriculture in the tropics, and is concerned with peasant agriculture, finance, education of the peasant, and kindred subjects, and concludes with a useful summary of the agricultural needs of the planting enterprise. In the chapter on the relations of the peasant to the land and crops the baneful influence of the money-lender who usually charges 50 per cent. interest is pointed out. This is followed by a discussion of co-operative credit societies, which are now doing good work in parts of India and Ceylon, &c.

The careful education of the peasant, as is pointed out, is the only method likely to be of value in improving the condition of agriculture in native hands, and this must be a very slow process. Something has already been done by the establishment of school gardens, and by these means and by peripatetic instructors much good is likely to arise in the future. As an instance of native conservatism, the Sinhalese villager will only manure betel-pepper with the leaves of *Croton lacciferum*, and refuses to employ another manure as good or perhaps better ; but before urging him to adopt some other method it is necessary to discover the reasons for his faith, and perhaps at the same time valuable knowledge may be gained in the process. Not only has the peasant proprietor much to learn, but also the owner of the large estate and Dr. Willis has much of value to say to both classes.

The concluding part is taken up with a consideration of agricultural organisation and policy and questions as to the administration of departments, laying out of lands, and the formation of agricultural societies. An adequate index concludes the volume.